

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-10793	-6981	-732	-1329	-1694	-533	*	*											
42	688	-1698	-342	1095	-2713	881	-2092	212	-571	-947	-931	412	-624	-1377	1728	-2731	-2651	-723	-2932	689
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-28	-10853	-5760	-732	-1329	-2629	-254	*	*											
43	-1326	-1683	1777	1763	-1023	-3	-322	213	-524	-1506	-3339	-2827	-2020	5	-43	-364	490	-2675	1527	-254
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-	-37	-10835	-5337	-732	-1329	-2256	-339	*	*											
44	-1300	-1676	803	789	-73	1088	-1270	1314	685	-589	-222	-775	-2614	-2728	-1642	-1590	-2628	-378	-2910	1729
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-	-1	-10826	-11826	-732	-1329	-2267	-336	*	*											
45	-697	-1700	264	1845	-1349	715	807	-487	-2221	-1240	629	57	-2639	-64	-529	647	-1184	400	-2934	-2776
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-53	-10855	-4802	-732	-1329	-2945	-201	*	*											
46	-798	-1655	263	31	-99	1207	-938	-29	93	115	608	34	-816	-848	268	-1371	-1351	664	-2889	465
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-	-159	-10802	-3270	-732	-1329	-2492	-282	*	*											
47	199	-1541	1477	-805	-682	306	1307	-1314	-1353	-2124	-226	1355	3	-2593	369	-314	-2494	477	493	779
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10670	-11670	-732	-1329	-3084	-181	*	*											
48	-230	-1557	580	-1202	-715	1035	1992	-380	580	-1519	-3213	-1183	-720	-2002	-108	77	-270	-1336	-2791	2145
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49	-1565	-1557	368	869	-1170	584	2113	-645	-540	-1614	-3213	-866	-2496	-552	-262	-767	-1835	637	-2791	2575
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-	-19	-10688	-6308	-732	-1329	-3561	-128	*	*											
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-	-57	-10670	-4711	-732	-1329	-3615	-123	*	*											
51	-558	-1494	142	-475	1601	-966	259	36	-2036	-1975	-468	117	-825	19	-807	-1047	860	310	-2728	2407
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-	-72	-10615	-4381	-732	-1329	-2573	-265	*	*											
52	-21	-1484	-1819	214	521	-825	4	-308	-1101	-618	-2065	935	889	-81	535	1035	-805	182	-2718	-439
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-	-36	-10602	-5378	-732	-1329	-3228	-163	*	*											
53	-1140	-1473	-1114	710	1830	-468	-1867	-619	1139	-2278	1045	543	-2412	-1567	38	777	-935	-762	-2707	882
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-	-105	-10589	-3848	-732	-1329	-2149	-368	*	*											
54	-1856	-1470	-1180	977	-952	-983	1880	-49	-1551	381	-3126	589	1026	76	428	-881	-1009	401	-2704	666
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-	-54	-10586	-4795	-732	-1329	-2130	-374	*	*											
55	123	-1510	-477	847	-813	-589	-1163	-1424	-280	-1445	-153	-243	997	-146	83	746	1031	-1356	-2744	950
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-88	-10633	-4091	-732	-1329	-2118	-378	*	*											
56	-577	-1512	-722	1002	-2528	-441	159	9	942	-629	-191	-475	-1542	-937	38	499	1	662	-2746	933
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-	-27	-10636	-5819	-732	-1329	-2634	-254	*	1188	-1476	1397	-255	-710	1199	-1180	-442	-525	-2428	1445	-409
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-	-8	-10658	-7651	-732	-1329	-2350	-315	*	*	*	*	*	*	*	*	*	*	*	*	*
58	-1746	-80	541	1438	-441	-992	774	-608	471	11	144	1008	796	-73	-358	-1130	-992	-2568	-2811	333
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-	-117	-10711	-3688	-732	-1329	-2973	-196	*	*	*	*	*	*	*	*	*	*	*	*	*
59	-830	-1493	-403	138	1111	877	1368	-660	1066	-1549	1013	-1659	-2432	69	-808	-1059	282	515	1336	-2569
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-	-148	-10613	-3369	-732	-1329	-2181	-359	*	*	*	*	*	*	*	*	*	*	*	*	*
60	-940	-1448	653	904	1041	-2055	1066	841	307	50	-140	455	-2387	-467	-725	-103	392	-2440	-2682	-500
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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61	967	-1427	455	830	-731	52	400	1474	-899	-1992	123	591	-2366	-396	-918	-42	-1189	-982	-2661	-115
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-50	-10534	-4911	-732	-1329	-1884	-456	*	*	*	*	*	*	*	*	*	*	*	*	*
62	-1574	-1509	-79	268	-96	-614	-57	223	372	-121	-986	-798	-2447	839	79	1260	51	-310	-1202	466
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-	-57	-10631	-4722	-732	-1329	-2368	-311	*	*	*	*	*	*	*	*	*	*	*	*	*
63	1038	-684	-325	972	-2534	1412	-604	280	-413	-102	-83	-430	-2457	-659	-14	-526	-1032	-1066	-2753	-1667
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-	-73	-10644	-4365	-732	-1329	-2534	-273	*	*	*	*	*	*	*	*	*	*	*	*	*
64	87	-1505	-822	-134	-1079	-1023	1562	178	1200	-52	-115	328	-2444	-398	-1733	1053	272	-1166	-2739	-16
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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65	-1088	-1616	914	-989	610	-20	1292	-469	301	-912	-300	107	-2555	1147	-13	-165	-2569	1227	-46	-494
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66	214	-1541	-265	-52	695	-159	269	-1685	863	-309	-3197	280	-2480	382	-1010	1180	-181	-997	-2775	715
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67	-118	-17	-952	698	931	1491	-286	193	-600	-788	-3197	319	-2442	838	-857	-470	384	-1259	-2775	-1478
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68	-198	-1541	121	370	-93	368	758	-876	69	104	42	122	-2480	-2593	-685	259	785	405	-2775	153
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69	782	-1525	-2683	1133	-61	-1336	-164	-1106	-894	1136	-1707	399	-2464	-504	-644	503	-428	144	-2759	-1570
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70	-555	-1661	-141	1105	-1129	-1	-24	1100	245	951	-3317	191	-2600	-1275	-961	-331	-1077	-989	917	-106
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71	784	-1642	-1650	1365	27	-448	472	378	-680	-2137	-3298	-621	-2581	1153	-2956	-731	1485	-579	453	-202
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10787	-11787	-732	-1329	-3232	-162	*	*	*	*	*	*	*	*	*	*	*	*	*

72	675	596	-756	-312	-1447	414	-1084	366	-2183	-452	-3298	482	-2581	171	-350	126	983	-47	-1066	1291
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74	247	-1613	-776	-29	-453	485	1018	249	140	-1045	-255	909	-2552	-488	173	445	788	-404	-2847	-1265
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75	-1188	486	-860	-998	-584	-557	2072	366	-321	200	-3229	640	-2512	691	-2887	60	-54	366	-2807	1850
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76	-255	-1555	-1782	930	-1036	-304	2721	-444	58	-154	-3210	1071	-2493	1186	-2869	-329	-2507	-94	-2789	596
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77	-1362	286	-834	-1256	-802	1213	801	-649	-1117	-777	-3273	417	-645	-1099	808	1080	-363	360	-2851	1081
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-	-35	-10759	-5408	-732	-1329	-2442	-293	*	*											
78	-1140	383	-286	-220	-1989	638	-1757	804	-331	798	-3274	1354	-2556	192	-178	-1484	69	-2609	-2852	1585
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79	-126	1300	-1019	-2897	-85	485	-785	-880	-895	353	-567	448	-2546	1487	-348	292	200	-499	-1192	1307
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80	-943	-1568	-1164	-420	667	516	-1962	210	92	-449	-3223	71	-2506	-2620	-2882	1193	735	838	-2802	1046
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81	-512	-1540	-1048	-749	-529	1277	-1934	-3154	-86	-1366	1325	-856	-2478	-273	-283	-29	1198	1369	-2774	230
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82	166	-1532	305	-348	-2548	-1253	-1927	206	-854	-1134	-3188	-823	-1740	936	873	1192	527	1119	-2766	-2608
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83	49	409	-2639	-444	-2497	-1066	-277	381	-240	625	-352	-601	57	457	810	534	-681	924	-2715	-2557
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84	-12	-1493	-112	-1572	-386	-1009	50	661	502	-591	-3149	1529	-1450	944	356	411	-1915	755	-2728	-2569
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-	-1	-10614	-11614	-732	-1329	-3357	-148	*	*											
85	-881	-1506	-669	242	-1352	-1186	-1900	1597	311	-758	-326	-482	334	-1743	1098	-739	1145	196	-2740	-2063
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86	651	-1506	689	992	-506	-2113	136	465	368	-1468	-3161	-625	39	847	201	-428	-843	589	-2740	-2582
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87	58	329	-2679	1195	-1446	312	820	267	195	288	-3177	-917	-783	-137	-567	-114	-403	785	-2755	-2597

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88	642	238	579	-214	517	-2129	-1004	281	74	-1358	-3177	-970	-819	2236	483	-2555	-2474	988	-2755	-2597
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89	967	-1521	-231	608	-2433	-1566	194	96	-304	383	-93	776	463	404	777	-2481	-884	-198	-2755	-2597
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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91	328	-1390	-188	-806	-282	-1036	1674	740	-304	-285	1415	428	-593	1184	451	-983	-2396	356	-2678	-2519
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-34	-10554	-5449	-732	-1329	-3836	-105	*	*											
92	733	-1416	656	-1158	-2431	4	-254	566	617	995	-3072	-954	-2355	387	-1365	-2130	363	503	-2650	-2492
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-	-1	-10521	-11521	-732	-1329	-2549	-270	*	*											
93	-448	1600	810	-1630	-2494	-125	181	-342	558	843	-3134	430	-2417	898	18	153	-1719	-217	-2713	-187
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138	367	-1322	-493	-367	-843	-1929	486	95	1140	170	307	436	-1116	912	751	-65	-313	-2275	-2556	52
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-	-2	-10408	-11408	-732	-1329	-4112	-86	*	*											
139	772	-1322	-647	-319	274	-1287	1378	-807	259	298	244	1028	-2261	-512	-257	313	8	-933	-2556	309
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10408	-11408	-732	-1329	-4112	-86	*	*											
140	390	-1322	1190	-244	-519	-754	-879	-834	-617	-874	-2978	1075	-2261	637	454	31	-503	622	-2556	856
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-	-2	-10408	-11408	-732	-1329	-3288	-156	*	*											
141	242	-1355	444	867	-396	-817	360	-2135	586	-530	1680	419	-2293	1013	-193	-1032	-415	-173	-2589	327
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10448	-11448	-732	-1329	-4043	-90	*	*											
142	861	-1355	558	-133	-2370	-865	319	514	270	861	-3011	-1784	-2293	1029	35	-685	-912	280	-2589	-2431
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10448	-11448	-732	-1329	-4043	-90	*	*											
143	967	-1355	-516	-176	331	-827	804	-195	1093	270	440	-41	-2293	1217	-1413	-866	-2307	220	-2589	-2431
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10448	-11448	-732	-1329	-4043	-90	*	*											
144	728	-1355	1501	-305	305	-1962	-1749	-1351	627	548	1569	-277	-2293	1437	-253	-2085	-2028	-994	-2589	-2431
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10448	-11448	-732	-1329	-4043	-90	*	*											
145	338	1093	834	274	925	-937	-1749	-1089	666	-3	433	-2017	-2293	412	183	-1052	349	76	-2589	-752
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-	-2	-10448	-10798	-732	-1329	-4043	-90	*	*											
146	494	-1355	1498	-811	135	-868	-1749	875	691	149	-2559	-1834	71	903	128	-844	-1844	-1203	-2589	-616
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-48	-10447	-4957	-732	-1329	-4008	-93	*	*											
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-	-2	-10401	-11401	-732	-1329	-4123	-85	*	*											
148	292	180	672	452	96	-1923	660	255	707	146	131	-260	-479	-1770	-735	13	628	-2307	1137	-2122
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150	-	200	1776	-205	1241	-419	-745	-14	*	*	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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154	-	-992	1273	-236	715	550	-1327	-914	*	*	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-56	-10313	-4750	-732	-1329	-4265	-77	*	*	*	*	*	*	*	*	*	*	*	*	*
165	-1973	1025	1278	352	-2215	-632	628	-859	-306	661	-2856	1162	181	393	-1454	-40	-2152	-836	1635	-36
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10258	-11258	-732	-1329	-4337	-73	*	*	*	*	*	*	*	*	*	*	*	*	*
166	-1973	-1200	226	835	686	-1807	62	-2137	710	201	-2856	928	-561	628	-95	349	-668	-513	2225	-2276
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-	-32	-10258	-5580	-732	-1329	-4337	-73	*	*	*	*	*	*	*	*	*	*	*	*	*
167	-175	-1176	1303	354	394	311	1420	-152	495	423	-2831	-578	-436	-1149	-2490	-651	-1992	3	-2410	-127
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-	-39	-10228	-5291	-732	-1329	-4377	-71	*	*	*	*	*	*	*	*	*	*	*	*	*
168	621	891	-28	775	-1467	-334	529	524	-432	338	-435	384	-455	331	-1552	-422	-2098	-303	906	-554
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-	-2	-10192	-11192	-732	-1329	-4428	-69	*	*	*	*	*	*	*	*	*	*	*	*	*
169	620	1536	746	92	-2161	-1753	-493	-261	438	-269	285	236	-504	530	-1978	-72	-317	-774	1025	923
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-	-17	-10192	-6494	-732	-1329	-4428	-69	*	*	*	*	*	*	*	*	*	*	*	*	*
170	483	1075	-63	599	-2149	-1386	504	652	143	190	-2789	-2277	254	-985	16	33	294	-561	1117	-470
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-	-2	-10176	-11176	-732	-1329	-4448	-68	*	*	*	*	*	*	*	*	*	*	*	*	*
171	-1068	1997	-111	1366	-266	-1741	1743	-978	-142	393	-920	-2277	-430	326	-2448	-203	-783	-1042	1692	964
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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172	846	47	433	806	-389	-599	849	-520	354	251	-2789	-2248	-491	862	-602	-2167	-7	-1649	1173	439
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173	49	-1133	630	739	-2149	325	963	660	95	586	-2789	-2035	-2072	431	-565	-629	-265	-688	1537	-2209
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-	-179	-10176	-3112	-732	-1329	-4099	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
174	-150	-1006	-817	521	-378	-1613	-258	408	764	863	-2662	-2149	-265	689	-1611	29	-323	-4	1168	79
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-	-55	-10015	-4768	-732	-1329	-4604	-61	*	*	*	*	*	*	*	*	*	*	*	*	*
175	-277	-870	-786	346	-1979	-644	1905	-875	848	1105	-2620	-292	-260	1463	-2278	-1997	-1917	-518	-2198	776
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176	-154	-862	764	242	-1769	-1441	1183	216	276	618	-2517	-2005	391	1094	-861	-125	-11	-1367	-2096	401
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-	-113	-9828	-3747	-732	-1329	-4759	-54	*	*	*	*	*	*	*	*	*	*	*	*	*
177	-715	-778	115	1007	-1793	-210	-1172	-469	557	165	551	-1921	-1716	1778	-1392	302	-1589	-819	-2012	1280
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-	-115	-9716	-3724	-732	-1329	-4836	-51	*	*	*	*	*	*	*	*	*	*	*	*	*
178	1036	1347	-1851	-237	-1533	222	-1088	677	15	376	-2286	-1837	46	1291	-2008	295	-888	-975	-1928	-646
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-	-109	-9602	-3800	-732	-1329	-4902	-49	*	*	*	*	*	*	*	*	*	*	*	*	*
179	248	-616	-558	956	-843	313	-1010	754	-1157	-200	-1621	-1759	-1555	367	-978	738	452	-775	1261	83

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-	-156	-9068	-3315	-732	-1329	-5152	-41	-41	*	*	*	*	*	*	*	*	*	*	*	*	*
186	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-165	-8914	-2292	-732	-1329	-4578	-62	-62	*	*	*	*	*	*	*	*	*	*	*	*	*
187	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-108	-8678	-3847	-732	-1329	-5263	-38	-38	*	*	*	*	*	*	*	*	*	*	*	*	*
188	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-256	-8577	-2646	-732	-1329	-5290	-37	-37	*	*	*	*	*	*	*	*	*	*	*	*	*
189	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-383	-8318	-2119	-732	-1329	-5336	-36	-36	*	*	*	*	*	*	*	*	*	*	*	*	*
190	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-364	-7930	-2192	-732	-1329	-5391	-35	-35	*	*	*	*	*	*	*	*	*	*	*	*	*
191	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-383	-7576	-2132	-732	-1329	-5431	-34	-34	*	*	*	*	*	*	*	*	*	*	*	*	*
192	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1610	-1760	-1407	-344	-2238	-5466	-33	-33	*	*	*	*	*	*	*	*	*	*	*	*	*
193	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-939	-5028	-1159	-714	-1357	-5509	-32	-32	*	*	*	*	*	*	*	*	*	*	*	*	*
194	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-192	965	-192	-366	-50	358	571	-649	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

106

11	-	-6	-8405	-9405	-732	-1329	-3551	-129	*	-1721	*	-306	-1762	-808	802	270	-1420	462	45	-507	-1340	202
-	-	776	-106	-506	-1437	718	483	1050	-7	-1721	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8405	-9405	-732	-1329	-3258	-159	*	-1724	*	177	-1765	-1253	1450	821	-300	8	680	-811	1608	-1185
12	-	67	-109	-1267	-1441	76	445	466	-500	-1724	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8408	-9408	-732	-1329	-2953	-199	*	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
13	-	1229	-115	-1028	-1447	17	65	1100	130	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8412	-9412	-732	-1329	-3380	-146	*	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
14	-	51	-115	-1273	-1447	257	464	-509	376	-1175	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8412	-9412	-732	-1329	-3380	-146	*	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
15	-	-670	-115	-1273	-1447	60	709	776	383	-1139	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8412	-9412	-732	-1329	-3380	-146	*	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
16	-	-6	-115	-1273	-1447	60	709	776	383	-1139	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8412	-9412	-732	-1329	-3380	-146	*	-1730	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
17	-	-84	1358	-1253	-1427	31	-76	791	214	-1710	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-7	-8372	-9372	-732	-1329	-2711	-239	*	-1733	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
18	-	-468	1261	-1276	-1449	-1133	640	1299	86	-1733	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8414	-9414	-732	-1329	-2708	-240	*	-1733	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
19	-	-184	1369	-1293	-1467	-58	114	-530	-274	-898	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8448	-9448	-732	-1329	-3155	-172	*	-1750	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
20	-	253	1009	-813	-1467	-501	337	-530	206	-1750	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8448	-9448	-732	-1329	-3155	-172	*	-1750	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
21	-	-103	1421	-1293	-1467	820	-315	-530	167	-1283	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8448	-9448	-732	-1329	-3155	-172	*	-1283	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
22	-	261	-135	-1293	-1467	-328	84	-530	612	-1451	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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23	-	-486	-135	-1293	-1467	295	-157	403	24	-896	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-6	-8448	-9448	-732	-1329	-3155	-172	*	-896	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
24	-	-909	-135	-1293	-1239	-1151	-106	-530	-677	-1750	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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25	-	-573	1406	-996	-789	-1151	175	1001	329	-857	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	206	979	-178	-352	-36	372	585	438	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-	-67	-8448	-4552	-732	-1329	-2655	-249	*	-635	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

26	-907	1153	-846	-155	-327	571	384	-1748	1383	-1243	780	600	-20	-1185	-1447	-59	1034	-1125	-1367	482
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8439	-9439	-732	-1329	-2660	-248	*	*	*	*	*	*	*	*	*	*	*	*	*
27	-308	1165	-24	-1134	879	269	-561	-1781	106	476	-1822	-1310	-1105	-1219	-1481	545	1353	-1158	-1401	1065
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
28	-940	1284	-300	-1498	657	-774	-52	-1781	-35	116	-1822	65	876	-375	-769	-260	276	-1158	-1401	2511
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
29	-166	1207	-1324	-1498	159	629	459	-1781	141	-374	-1822	558	995	1161	-1142	602	-1119	-795	-1401	644
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
30	-940	1639	-1324	-783	442	1408	-561	-1781	447	768	-1822	-1310	237	40	-1481	502	-1119	-360	-1401	-1242
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
31	-42	-166	-388	-674	722	94	-561	-1781	-429	312	263	1178	13	157	-61	475	-383	-819	-1401	251
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
32	190	1956	-893	-1498	749	-446	34	-1781	829	592	-1822	57	-436	-649	-1481	-927	-632	-33	-1401	1836
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
33	38	1221	-1082	-952	61	1359	986	-1781	794	279	-1822	234	-1105	445	-1481	-1200	717	-1158	-1401	-1242
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-3048	-186	*	*	*	*	*	*	*	*	*	*	*	*	*
34	-940	1858	-619	-783	2315	-774	585	-1781	695	212	-1822	-136	-1105	185	-847	-145	-186	-1158	-1401	135
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8510	-9510	-732	-1329	-2398	-303	*	*	*	*	*	*	*	*	*	*	*	*	*
35	-214	2202	-1381	-1115	512	-452	746	-1838	-47	374	-213	-925	-77	-333	749	326	295	-662	-1457	655
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
36	-311	2007	-992	-868	-108	28	1013	-650	67	690	597	-1367	-137	512	-1537	175	-351	116	-1457	7
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
37	-394	1506	-921	-1555	640	887	-617	-1838	-34	-263	-1879	-1367	792	779	-641	564	620	-27	-1457	-1299
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
38	1004	2135	-1381	-1555	1697	140	-617	-1838	-122	359	-1879	-1367	-259	576	-1537	-1257	379	-272	-1457	-1299
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
39	166	1147	-1381	-1555	-423	-830	-617	-1529	711	1113	-1879	78	108	1287	-1537	-535	337	-1031	1225	-292
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
40	453	-223	-1381	-1318	-1238	-830	1606	-1838	613	498	-1879	278	-129	983	-1537	294	204	-20	1128	-462
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
41	-234	1704	-235	-1555	-1238	-504	-617	-975	1275	-139	-1879	-30	-1162	-436	-1537	994	342	549	1284	-1299

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
42	-997	1665	-1381	-835	-111	1090	-617	-1838	368	-1333	893	-1367	567	-21	-1537	1041	427	317	13	-1299
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-8617	-9617	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
43	-101	1922	-1381	-1555	423	-830	-617	-1838	-765	-351	116	-1367	14	-1275	-196	184	2009	697	-1457	-1299
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-67	-8617	-4553	-732	-1329	-2913	-205	*	*	*	*	*	*	*	*	*	*	*	*	*
44	1268	2174	-1346	-1519	-119	-795	-582	-1802	15	-946	-1844	-523	-168	999	-1502	-1221	1091	392	1193	57
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-67	-8549	-4558	-732	-1329	-3040	-187	*	*	*	*	*	*	*	*	*	*	*	*	*
45	-502	1983	-1311	-283	-1168	-760	-547	-1768	1501	161	-1809	-634	-89	1109	-1467	205	-73	226	-1387	176
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-78	-8478	-4319	-732	-1329	-2699	-241	*	*	*	*	*	*	*	*	*	*	*	*	*
46	-264	-131	-1289	-1463	-1146	-738	-525	-1746	58	415	-1787	-1275	-475	603	-1445	1749	615	-34	1973	-1207
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-8431	-4196	-732	-1329	-2786	-226	*	*	*	*	*	*	*	*	*	*	*	*	*
47	406	-111	-1269	-990	-297	-718	-505	-1726	44	252	-1767	-1255	-586	37	-1425	16	-121	1642	1487	1045
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-76	-8409	-4370	-732	-1329	-3178	-169	*	*	*	*	*	*	*	*	*	*	*	*	*
48	61	1314	-1230	-1404	-415	-680	-467	-1687	732	-123	192	377	-787	-1124	-1387	674	1402	-67	1824	-1148
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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72	-314	459	-699	-872	-556	-148	65	-1155	378	-503	-1197	-684	-480	-593	-855	942	-494	1818	-775	-617
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-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

//

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 LENG 23
 ALPH Amino
 RF no
 CS no
 COM [converted from an old Plan9 HMM]
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 DATE Mon Mar 8 11:45:33 1999
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 NULT -4 -8455
 NULE 595 -1558 85 338 -294 -294 -8455 -4 -8455 -4
 HMM A C D E F G H I K L M N P Q R S T V W Y

	m->m	m->i	m->d	i->m	i->i	d->m	d->d	b->m	m->e	249	902	L	M	N	P	Q	R	S	T	V	W	Y
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2	-957	2346	-1301	1115	-22	-323	636	-1168	1212	-252	-1982	-382	-1185	610	-420	208	64	-1221	-2252	-1904		
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NY02:195661.1

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-	-65	-14816	-4507	-732	-1329	-7551	-8	*	*	*	*	*	*	*	*	*	*	*	*	*
17	-826	-1028	-2380	-1478	-1857	-2686	3101	1003	238	-985	-630	-261	-3424	1062	873	-651	888	-3	-4439	-1023
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-14726	-5598	-732	-1329	-8598	-4	*	*	*	*	*	*	*	*	*	*	*	*	*
18	-1830	-1394	-2842	-809	-2200	-2648	3324	-112	915	-447	222	-942	-4183	1387	1467	-1072	-295	-209	-2549	-1739
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-147	-14683	-3370	-732	-1329	-8629	-4	*	*	*	*	*	*	*	*	*	*	*	*	*
19	-3489	-1950	-3708	-2768	-3104	-3390	4399	-140	-144	-1530	99	-2273	-3370	684	1062	-1820	51	-422	-1262	-2036
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-95	-14454	-3975	-732	-1329	-8760	-3	*	*	*	*	*	*	*	*	*	*	*	*	*
20	-2572	-1108	-5317	-940	-3026	-3135	3105	377	907	-1048	837	-1849	-5237	2189	1360	-1684	137	-777	-1488	-1917
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-290	-14302	-2455	-732	-1329	-8841	-3	*	*	*	*	*	*	*	*	*	*	*	*	*
21	-2039	-2107	-4863	-3827	-3127	-3908	3678	781	587	-2701	-177	-2678	-5143	-1564	2450	-1589	688	-1339	-3636	-2666
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-416	-13813	-1998	-732	-1329	-8708	-3	*	*	*	*	*	*	*	*	*	*	*	*	*
22	-2699	-2243	-4411	-3938	-3424	-3284	3848	2052	-674	-1812	-135	-3164	-4231	-1357	-1729	-1006	1488	159	-1243	-2097
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-629	-13206	-1501	-732	-1329	-9426	-2	*	*	*	*	*	*	*	*	*	*	*	*	*
23	-3078	-2305	-3462	-3636	-3320	-2912	4734	-208	-615	-3414	-490	-3448	-3243	-3357	2073	-3338	-3257	-3296	-3539	-3381
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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10	136	909	-249	-422	-106	302	515	-706	1065	-201	-747	-235	-30	-143	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
11	136	909	-249	-422	-106	302	515	-706	1065	-201	-747	-235	-30	-143	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
12	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	961	-143	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*											
13	136	909	-249	-422	-106	302	515	-706	367	465	-747	-235	-30	-143	-405	-124	-44	-83	-325	-167
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	-15	7180	8180	732	1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
13	-167	606	7	367	-409	335	212	72	402	239	-88	230	333	135	355	-215	-347	-385	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
14	75	606	-247	-312	-409	-1	838	758	406	-172	-1050	403	-333	-106	-708	-185	6	89	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
15	30	606	-552	-725	-409	-1	212	-53	663	255	642	-538	178	-81	-708	-222	37	276	-628	147
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
16	167	606	552	725	375	360	212	655	723	-504	235	-30	-49	-446	46	-39	-347	-65	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
17	-167	606	-552	-725	-409	308	212	800	430	-224	-1050	-58	-333	-446	-708	925	-203	-175	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
18	203	1485	552	435	-409	552	212	-354	406	4	-1050	-58	-333	-446	-708	102	383	-151	-628	82
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
19	-118	1368	-552	95	25	640	212	-1009	459	27	-1050	132	-333	-446	-708	518	-347	57	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
20	-167	606	-175	212	-409	362	212	-1009	430	45	-1050	-110	324	198	46	-31	421	-385	720	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
21	158	606	374	-657	299	335	212	-19	474	-504	-1050	-110	-333	501	-175	-427	313	-67	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
22	-167	1723	-205	-725	643	362	212	-304	333	-253	-1050	490	539	-446	-708	127	-277	-385	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
23	240	1313	4	354	-409	335	212	-1009	65	-179	-1050	-538	381	548	-708	-163	434	-385	-628	-17
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
24	30	606	-552	327	-56	-1	1018	-1009	218	-504	-1050	-51	310	947	-708	201	172	-104	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
25	236	606	-129	-725	302	193	916	-1009	65	-504	-1050	436	188	-446	-708	702	135	-385	-628	411
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-69	7180	-4558	-732	-1329	-4366	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
26	-149	1887	-485	141	272	17	230	-174	351	-266	-1032	-171	167	-428	-690	135	188	-367	-610	320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	7128	8128	-732	-1329	-4209	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
27	236	1622	172	-181	-409	-1	212	-151	745	-249	-1050	-538	-248	925	-708	-427	99	-385	-628	-470
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7180	8180	732	-1329	-4152	-84	*	*	*	*	*	*	*	*	*	*	*	*	*
28	-191	582	102	-391	-433	-25	998	-1032	41	446	-1074	-244	-357	903	-122	193	109	-150	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	7248	-8248	-732	-1329	-4354	-72	*	*	*	*	*	*	*	*	*	*	*	*	*

29	-191	582	366	13	-433	-25	945	-559	302	-85	-1074	-561	-357	46	22	138	146	-182	-652	717
-	206	979	-178	-352	-36	372	585	-635	438	-130	677	-164	41	-73	335	-54	27	-12	-255	-97
-	-14	-7248	8248	-732	-1329	-4354	-72	*	*											
30	6	582	163	-341	337	-25	188	-245	94	370	-1074	46	-357	-329	68	-451	473	-409	-652	335
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-54	-7248	-5048	-732	-1329	-4354	-72	*	*											
31	-82	596	-24	-735	-419	-11	202	-193	788	-104	-843	364	-59	277	-718	-137	462	-187	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
32	-177	1688	-562	183	-91	-11	202	-1019	709	-233	-1060	362	-343	228	-718	536	-357	-395	-638	316
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
33	403	1100	-552	-221	217	231	1009	-1019	55	-513	478	-548	-343	-456	121	636	162	-395	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
34	-177	1173	62	-735	-419	-11	907	-268	55	-266	-1060	244	-343	-456	-718	362	606	235	-638	475
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
35	143	1484	692	151	-419	228	202	-113	450	-513	11	80	-343	-456	-718	-437	95	-113	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
36	143	1326	245	-215	289	-11	762	-202	420	-338	-398	-119	-343	-456	-230	458	-357	-360	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
37	189	596	202	-212	197	-11	1012	-162	240	-513	-1060	-548	9	-456	434	-22	104	395	638	475
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
38	399	596	-86	-735	68	200	959	-264	286	-259	-1060	-224	-343	-456	-374	312	357	615	638	480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	15	-7210	-8210	-732	-1329	-4362	-72	*	*											
39	-177	596	62	-376	-419	-11	202	-314	316	-513	-1060	569	570	338	-105	-49	1	187	638	73
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
40	-177	596	19	-735	292	-11	1078	-47	737	-513	363	402	178	-456	-26	-173	36	-360	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4362	-72	*	*											
41	559	596	-257	-610	982	122	202	-555	538	-140	-1060	-548	-343	72	-84	-437	-283	342	-638	-480
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	-7210	-8210	-732	-1329	-4228	-79	*	*											
42	371	582	-489	302	54	-25	188	-655	759	-30	-1074	-238	-357	324	-628	-451	96	309	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
43	586	582	-576	-391	-433	144	188	112	638	3	-1074	343	280	-470	-732	-392	-13	33	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
44	393	582	102	-23	-433	-25	188	238	271	139	-926	93	-357	-470	240	-60	-370	-409	-652	-41
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*											
45	321	582	148	304	487	-25	188	-655	521	184	-1074	-489	-357	-359	246	-208	-227	-127	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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46	14	7246	8248	-732	-1329	-4354	72	*	928	82	1074	200	154	-470	199	451	370	176	-652	494
	23	582	-398	-175	80	-25	188	172	438	-130	677	164	41	73	335	54	27	-12	255	97
	206	979	178	-352	-36	372	585	-635	*											
	-14	-7248	8248	-732	-1329	-4354	-72	*												
47	191	582	-199	-749	-433	214	188	-92	718	340	-1074	-561	-357	-470	-111	454	81	-230	652	291
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	255	-97
	-89	7248	-4226	-732	-1329	-4354	-72	*												
48	371	608	-121	-99	-407	1	214	-13	748	-182	-1048	225	-331	59	-659	-425	-345	-123	-626	891
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-15	-7173	-8173	-732	-1329	-4139	-84	*												
49	-191	1461	-576	655	-433	514	188	-1032	375	-180	-1074	-456	-357	-470	-119	-63	-370	146	-652	856
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-14	-7248	-8248	-732	-1329	-4354	-72	*												
50	212	1227	-298	99	-80	186	430	174	434	-527	665	-456	-357	-470	-732	-63	-370	7	-652	627
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-14	7248	-8248	-732	-1329	-4354	-72	*												
51	612	582	-576	118	-162	132	188	396	378	169	-1074	-561	-357	-21	-732	-451	-18	-203	-652	130
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-14	-7248	-8248	-732	-1329	-4354	-72	*												
52	-191	582	-576	473	2	466	188	443	226	121	-1074	-75	-357	-55	-732	-63	-370	-409	-652	391
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-14	-7248	-8248	-732	-1329	-4354	-72	*												
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		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-19	-6832	-7832	-732	-1329	-4416	-69	*	*	174	233	-941	59	-223	-337	280	80	-237	-65	-519	-361
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		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-19	-6832	-7832	-732	-1329	-4416	-69	*	*	480	154	-134	80	-223	-337	-599	-318	237	677	-519	361
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		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	97	
		-19	-6832	-7832	-732	-1329	-4172	-82	*	*	144	573	-971	-458	-253	-367	-629	466	-267	214	-549	-391
105	-	127	685	-95	-646	-330	78	291	-23	144	573	-971	-458	-253	-367	-629	466	-267	214	-549	-391	
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-18	-6934	-7934	-732	-1329	-4008	-93	*	*	95	160	284	303	279	-416	-196	-14	-317	175	-598	-440
106	-	266	636	-522	-39	-379	29	242	-316	95	160	284	303	279	-416	-196	-14	-317	175	-598	-440	
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-16	-7091	-8091	-732	-1329	-4381	-71	*	*	307	-474	-1020	-212	-303	-416	264	92	200	-74	-598	-440
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		-16	-7091	-8091	-732	-1329	-4127	-85	*	*	66	-502	-1048	-138	182	-444	-706	354	364	-102	-626	-468
109	-	109	1019	-373	-315	626	1	1384	-310	66	-502	-1048	-138	182	-444	-706	354	364	-102	-626	-468	
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-15	-7173	-8173	-732	-1329	-4139	-84	*	*	473	-527	459	-561	641	-470	-732	-36	-370	-409	-652	123
110	-	537	582	-576	-749	1140	-25	763	-434	473	-527	459	-561	641	-470	-732	-36	-370	-409	-652	123	
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97	
		-106	-7248	-3962	-732	-1329	-4354	-72	*	*	72	-97	-1043	-135	582	-439	315	-156	-339	38	1145	-463
111	-	54	613	0	-718	234	245	1103	-1001	72	-97	-1043	-135	582	-439	315	-156	-339	38	1145	-463	
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	206	979	-178	352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	-54	27	-12	-255	-97
	15	7156	8156	-732	1329	4100	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
113	191	582	-576	-166	278	-25	188	244	41	-87	331	-561	280	-470	732	264	583	178	-652	58
-	206	979	-178	-352	-36	372	585	-635	438	-130	677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7248	-8248	732	1329	-4354	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
114	235	825	576	-156	230	-25	188	-18	41	267	-1074	-561	682	-470	732	348	-370	97	-652	-494
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	7248	-8248	-732	1329	-4354	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
115	331	1086	-576	-236	60	372	188	-1032	41	30	649	-561	187	-470	-309	-153	83	65	1120	-494
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-	-14	-7248	-8248	-732	-1329	-4354	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
116	624	1565	-576	-749	-433	290	188	-278	41	108	-1074	200	-357	33	-732	-187	81	-1	1032	-494
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117	165	1770	76	-718	91	6	933	210	72	240	-1043	-530	-325	-439	-701	132	173	-378	-621	-463
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-15	7156	-8156	-732	-1329	-4369	-72	*	*	*	*	*	*	*	*	*	*	*	*	*
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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122	79	637	322	-694	238	30	243	-375	96	330	-1018	-506	-301	-415	-677	-396	232	596	-597	443
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-	-16	7084	-8084	-732	-1329	-4381	-71	*	*	*	*	*	*	*	*	*	*	*	*	*
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124	-136	637	-520	-363	791	241	243	-977	440	-225	36	-506	284	508	-677	-396	42	74	-597	769
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-	-73	-7084	-4563	-732	-1329	-4112	-86	*	*	*	*	*	*	*	*	*	*	*	*	*
125	451	624	-534	-708	838	17	805	-324	475	-486	-1032	-172	229	-428	-690	351	-20	-368	-610	320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7129	-8129	-732	-1329	-3228	-163	*	*	*	*	*	*	*	*	*	*	*	*	*
126	-328	445	-336	-886	420	-162	579	-503	458	-489	-1211	-698	143	-607	-444	1223	-159	-72	-789	821
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-7618	8618	-732	-1329	-4287	-76	*	*	*	*	*	*	*	*	*	*	*	*	*
127	-328	445	-407	-363	659	-162	51	-419	376	-446	-1211	-698	-98	-607	-869	-157	1549	-138	-789	700
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-118	-7618	3763	-732	-1329	-4287	-76	*	*	*	*	*	*	*	*	*	*	*	*	*
128	-185	488	-669	-249	138	-70	94	100	-53	-621	-1167	-35	-450	-564	-826	1430	-150	-172	594	303
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7517	8517	-732	-1329	-4318	-74	*	*	*	*	*	*	*	*	*	*	*	*	*

129	119	488	-669	328	399	52	94	-209	345	-521	1167	-655	-450	1870	264	276	-464	28	745	243
	206	979	178	-352	-36	372	585	-635	438	130	577	164	41	-73	335	-54	27	12	255	97
130	-55	7517	-4959	-732	1329	4099	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
	286	487	-671	-196	528	120	93	-1128	312	-374	1169	1755	268	-112	627	-351	155	786	747	598
	206	979	-178	-352	-36	372	585	-635	438	-130	577	-164	41	-73	335	-54	27	12	255	97
	-12	-7518	-8518	-732	1329	-4102	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
131	164	465	-386	-866	-550	142	71	499	-76	928	398	125	-20	-587	-235	-568	-438	228	455	-611
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7572	-8572	-732	1329	-4302	-75	*	*	*	*	*	*	*	*	*	*	*	*	*
132	308	465	1507	-268	221	135	789	221	-76	-145	109	-678	-474	-587	-156	-389	-487	-207	-769	-611
	-206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7572	-8572	-732	1329	-4263	-77	*	*	*	*	*	*	*	*	*	*	*	*	*
133	-311	462	231	62	406	-95	68	-1152	-79	-428	-1194	-134	-476	-3	-249	1408	-490	-51	-772	-614
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-56	7579	-4941	-732	-1329	-4300	-75	*	*	*	*	*	*	*	*	*	*	*	*	*
134	-193	480	-253	111	-179	1410	173	-1134	-61	-629	-1176	-33	53	-572	-834	124	-473	619	-754	-596
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	12	-7539	8539	-732	-1329	-4150	-84	*	*	*	*	*	*	*	*	*	*	*	*	*
135	10	464	-694	87	-552	71	69	-321	-78	-259	-1192	-680	353	-588	-850	-266	1616	129	-770	-338
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7579	-8579	-732	-1329	-4305	-75	*	*	*	*	*	*	*	*	*	*	*	*	*
136	-310	464	1572	-353	-552	218	947	-445	185	-141	-1192	-191	-475	-588	-151	-332	-175	-113	273	-612
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7579	-8579	-732	-1329	-4305	-75	*	*	*	*	*	*	*	*	*	*	*	*	*
137	-24	464	-312	-868	-552	366	69	-770	-78	1171	-1192	-249	39	-588	-131	111	-489	-528	770	344
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
	11	-7579	-8579	-732	-1329	-4069	-89	*	*	*	*	*	*	*	*	*	*	*	*	*
138	-332	441	-717	162	-86	78	924	-1174	-100	105	-1215	-703	-498	-611	-259	1501	-226	550	793	8
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
	-11	-7632	-8632	-732	-1329	-4117	-86	*	*	*	*	*	*	*	*	*	*	*	*	*
139	348	425	23	516	1981	-182	31	-1190	115	-685	-143	-369	-246	-627	-196	254	-60	-566	-809	-651
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7669	-8669	-732	-1329	-4281	-76	*	*	*	*	*	*	*	*	*	*	*	*	*
140	-133	425	181	-351	223	182	31	-1190	-116	-195	-143	-512	1598	-627	228	-608	-76	-338	-809	305
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7669	-8669	-732	-1329	-4281	-76	*	*	*	*	*	*	*	*	*	*	*	*	*
141	-348	425	-194	-906	233	408	31	-1190	714	73	207	-719	164	-627	-889	-608	-294	-566	3283	-33
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-11	-7669	-8669	-732	-1329	-4053	-90	*	*	*	*	*	*	*	*	*	*	*	*	*
142	-365	408	-373	-923	685	-199	14	1270	128	-93	37	-387	-124	-644	-293	125	-544	283	398	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*	*	*	*	*	*	*	*	*	*	*	*
143	-115	408	-750	-923	324	-199	731	-108	259	932	-1248	-735	565	-644	-210	-210	-93	71	-826	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*	*	*	*	*	*	*	*	*	*	*	*
144	-47	408	-126	-275	-58	-199	820	-688	352	-198	-1248	1633	-6	-644	-257	-625	-544	-256	1418	-115
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7705	-8705	-732	-1329	-4265	-77	*	*	*	*	*	*	*	*	*	*	*	*	*
145	-193	408	-169	-520	17	199	719	-378	98	-128	195	177	-531	-644	-906	-323	-544	1498	810	-668
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

146	-	-10	-7705	-8705	732	-1329	-4265	-77	*	*	1051	117	-37	531	644	906	-2	-492	284	826	-668
	146	92	408	205	-509	381	199	14	299	-133	1051	117	-37	531	644	906	-2	-492	284	826	-668
		206	979	-178	352	-36	372	585	-635	-438	-130	-677	-164	41	73	335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
147	-	-365	408	-157	7	120	-199	14	-109	262	246	-1248	1773	-531	-644	-906	52	-544	-141	-826	-668
		206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	732	-1329	-4265	-77	*	*											
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		206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	732	-1329	-4265	-77	*	*											
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		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	732	-1329	-4265	-77	*	*											
150	-	1187	408	-93	400	121	44	14	-544	258	-40	-1248	2	-531	3	-906	-382	-544	-265	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	732	-1329	-4265	-77	*	*											
151	-	-150	408	-17	-17	1781	-199	14	0	-79	-244	-1248	129	-531	86	-906	-177	-187	187	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
152	-	-149	408	1450	-403	-171	198	582	339	98	-211	-1248	-735	216	220	-906	9	-544	-583	-826	-668
		206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	8705	-732	-1329	-4265	-77	*	*											
153	-	21	408	-372	236	1691	-199	583	-67	173	20	-1248	-120	75	-644	-906	-327	-544	583	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
154	-	-80	1287	-315	547	918	-199	14	-1206	-133	-180	-1248	-735	-446	-644	-906	70	544	583	826	2189
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
155	-	-365	408	-750	184	206	12	644	-1206	1495	-447	587	-735	-531	90	-152	-179	-197	-169	826	267
		206	979	-178	-352	36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
156	-	-45	408	-192	-275	685	-199	14	-216	98	-328	-1248	-307	-531	40	32	-1	-544	1265	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
157	-	1	408	-327	923	31	-199	1100	1424	231	72	-1248	-735	-531	-229	-906	-625	-544	140	789	300
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
158	-	89	408	-750	1609	-607	-199	14	-337	645	-354	-189	-735	-531	-644	-906	-625	-236	-63	940	130
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
159	-	-365	408	-750	345	-607	-199	14	-52	787	-701	-1248	-735	-531	-644	-482	1295	-28	176	768	-668
		206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	8705	-732	-1329	-4265	-77	*	*											
160	-	-365	408	-750	-232	1781	254	890	150	128	-326	-1248	-37	-531	-644	-906	-7	246	-159	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
161	-	3	408	-321	-47	-171	-199	575	1417	-133	189	-287	764	-531	-644	-906	-234	-544	-583	-826	-668
		206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
		-10	-7705	-8705	-732	-1329	-4265	-77	*	*											
162	-	-24	408	-750	-391	-107	-199	14	-133	1495	-110	-1248	414	-20	-644	-906	117	-544	-55	947	-668

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179	-453	1359	637	1795	-695	-287	-74	1294	-221	-278	1336	537	18	732	-345	295	-632	193	914	-756
	206	979	178	352	-36	372	585	635	436	-130	577	-164	41	-73	315	-54	27	12	255	-97
	-37	-7912	-5567	-732	-1329	-4216	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
180	-440	333	825	555	-682	1500	928	-1282	-208	-169	-24	-811	19	146	498	302	620	216	901	743
	-206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-108	-7884	3876	-732	-1329	4080	-88	*	*	*	*	*	*	*	*	*	*	*	*	*
181	-91	364	23	-551	-651	-243	475	113	-178	-348	-1292	-780	2002	-266	225	-395	-569	-628	1010	-712
	206	979	-178	352	-36	372	585	635	436	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-10	-7615	8815	732	-1329	-4245	-78	*	*	*	*	*	*	*	*	*	*	*	*	*
182	237	1371	-116	358	-163	-243	30	-96	-178	-746	-1292	-780	-61	-688	-523	-51	1705	-628	741	-712
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7815	8815	732	-1329	-4035	-91	*	*	*	*	*	*	*	*	*	*	*	*	*
183	429	1423	1752	907	-671	-263	-50	-804	-197	-561	360	-799	-243	-189	179	-689	-609	-647	150	-732
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-9	-7859	-8859	-732	-1329	-4232	-79	*	*	*	*	*	*	*	*	*	*	*	*	*
184	-429	344	-814	547	-671	-263	2958	-400	145	-46	-344	-799	-595	105	-970	-298	-27	-238	-890	-732
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-113	-7859	-3814	-732	-1329	-4232	-79	*	*	*	*	*	*	*	*	*	*	*	*	*
185	-384	858	-768	-580	-190	97	-5	260	-152	1170	-1266	-754	-35	-446	134	213	-563	-278	-844	-686
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7757	-8757	-732	-1329	-4117	-86	*	*	*	*	*	*	*	*	*	*	*	*	*
186	-397	376	314	1617	-22	-231	-18	-204	390	169	-367	-767	-562	-676	-938	-60	-576	-615	-858	-699
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7787	-8787	-732	-1329	-4026	-91	*	*	*	*	*	*	*	*	*	*	*	*	*
187	185	355	-318	203	-661	-253	-40	-1260	-187	-344	29	-27	-79	-193	-346	1582	-598	-355	-879	-721
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-10	-7836	-8836	-732	-1329	-4239	-78	*	*	*	*	*	*	*	*	*	*	*	*	*
188	1439	355	803	37	-661	-253	599	-445	-187	-430	-214	-180	-299	-697	-566	78	-598	-194	1531	-95
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7836	-8836	-732	-1329	-4239	-78	*	*	*	*	*	*	*	*	*	*	*	*	*
189	-167	3398	803	-640	156	-253	-40	-555	271	244	-1301	362	-584	-697	-960	-378	-598	-637	350	62
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-10	-7836	-8836	-732	-1329	-4239	-78	*	*	*	*	*	*	*	*	*	*	*	*	*
190	147	355	-803	-573	601	-253	-40	-1260	29	-242	-1301	261	1878	-247	-204	85	-598	-637	488	-721
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-79	-7836	4354	-732	-1329	-2785	-226	*	*	*	*	*	*	*	*	*	*	*	*	*
191	-273	166	1705	-23	-849	-242	-228	-1448	-375	868	-1490	-547	-227	-886	-670	-86	-786	-304	1657	-910
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-53	-8233	4922	-732	-1329	-4121	-85	*	*	*	*	*	*	*	*	*	*	*	*	*
192	-385	190	-585	-736	-196	-418	-205	-768	516	-451	-1466	1898	-749	-863	-1125	1402	-563	-802	617	-886
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	-8187	9187	-732	-1329	-3869	-102	*	*	*	*	*	*	*	*	*	*	*	*	*
193	-607	166	613	-1165	-413	246	-156	-531	-375	916	-1490	-136	1918	-572	-203	-164	-426	-825	-1068	-910
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	-8233	-9233	-732	-1329	-4121	-85	*	*	*	*	*	*	*	*	*	*	*	*	*
194	-607	166	-521	-747	-184	-441	-228	-1448	52	1068	-1490	400	1689	-380	-721	-220	-220	-409	-1068	-910
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-7	-8233	-9233	-732	-1329	-4121	-85	*	*	*	*	*	*	*	*	*	*	*	*	*
195	-287	1047	-490	-302	1995	-130	-228	-1448	-375	935	-1490	-977	-772	-517	-1148	194	129	-825	-1068	-387
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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196	-	-7	-8233	9233	732	-1329	3706	-115	*	-413	-723	-1527	-611	43	1798	-573	-332	537	445	1105	-947
-	196	-481	129	1590	121	445	161	266	779	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97
-	206	979	178	178	352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
-	-50	-8305	-5004	-5004	-732	-1329	-4093	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
197	-622	151	-623	1180	-864	-864	-119	-243	-1463	-203	1185	-1504	1954	0	-395	-1163	8	-801	-222	-1083	-284
-	206	979	-178	352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8262	-9262	-732	-1329	-3842	-104	-104	*	*	*	*	*	*	*	*	*	*	*	*	*
198	-645	129	-721	-197	-886	-266	-266	-266	1468	-413	-350	-1527	1850	-412	-923	-573	-905	198	-453	1620	-947
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8305	-9305	-732	-1329	-4093	-87	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
199	187	129	-302	-317	-310	29	29	2616	-686	1606	-981	-1527	-1015	-407	-285	-334	-594	-824	-341	-1105	-801
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8305	-9305	-732	-1329	-3712	-115	-115	*	*	*	*	*	*	*	*	*	*	*	*	*
200	-515	96	-560	383	-920	80	80	206	-1519	-171	-756	1103	-133	-446	1935	-727	-938	1363	-630	-1139	-980
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8368	-9368	-732	-1329	-4067	-89	-89	*	*	*	*	*	*	*	*	*	*	*	*	*
201	1173	96	1062	-1236	-920	-341	-299	-299	-302	-446	-159	-272	-391	144	-500	-1219	1598	-507	-341	-1139	-980
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-8368	-5809	-732	-1329	-4067	-89	-89	*	*	*	*	*	*	*	*	*	*	*	*	*
202	1185	108	-502	-862	-907	-499	47	47	-813	1586	-1001	-1548	-1035	806	42	-365	-403	-65	-188	-1126	-968
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8344	-9344	-732	-1329	-4077	-88	-88	*	*	*	*	*	*	*	*	*	*	*	*	*
203	162	108	2497	-1223	-907	-287	-287	-286	-1506	73	-1001	-259	-631	-830	286	-1097	-452	33	-83	-1126	-968
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
-	-408	-8344	-2039	-732	-1329	-4077	-88	-88	*	*	*	*	*	*	*	*	*	*	*	*	*
204	-77	308	-227	138	-707	-299	-299	-86	-1306	-233	-553	471	597	-630	-77	1947	359	644	641	926	768
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-9	-7941	-8941	-732	-1329	-4214	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
205	-14	814	849	1644	-298	-299	326	326	-1306	-233	103	19	20	183	-326	-577	116	-498	641	926	768
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-14	-7941	-5705	-732	-1329	-4001	-93	-93	*	*	*	*	*	*	*	*	*	*	*	*	*
206	-473	300	-311	-140	-715	1665	-94	-94	-658	-23	-411	-392	-57	943	-752	-304	-733	188	-691	-934	-776
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
207	287	300	575	-471	-627	-93	-93	-94	-658	-211	-589	11	-843	2174	-752	227	-259	-652	29	-934	-776
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
208	-473	300	857	1031	-715	74	613	613	-1314	-241	-386	-1355	-413	351	392	-142	335	1854	-153	-934	-776
-	206	979	-177	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2179	-364	-8958	-121	-3632	-4209	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
209	-473	714	55	-382	-715	20	3043	3043	-608	-241	-157	-392	-843	439	-103	-410	-563	127	-691	-934	-776
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7958	-8958	-732	-1329	-4209	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
210	94	633	-419	1031	-715	-307	856	856	553	102	1286	-1355	-361	-133	-643	-1014	-341	-217	-282	-934	-776
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-28	-7958	-6050	-732	-1329	-4209	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
211	-464	1005	-774	1596	-706	308	1409	1409	-1305	106	-425	-1347	-401	-277	557	-393	-724	-571	-252	-925	190
-	206	979	-178	-352	-36	372	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-68	-7940	-4566	-732	-1329	-4102	-87	-87	*	*	*	*	*	*	*	*	*	*	*	*	*
212	-54	327	-264	-235	-688	-280	-280	-67	-469	-214	-741	-22	-118	-66	-725	-562	1740	421	-664	-907	-749

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207	979	179	352	352	352	372	585	-635	438	-130	-677	-164	40	73	-335	-54	27	12	255	-97
2121	-381	-8901	127	3572	-4133	-85	-85	*	*	*	*	*	*	*	*	*	*	*	*	*
213	6	3381	-838	341	-696	110	429	-200	10	-628	-1336	-207	790	309	-995	-322	-633	229	915	756
206	979	-178	352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-37	-7917	-5565	732	1329	-3848	-104	-104	*	*	*	*	*	*	*	*	*	*	*	*	*
214	128	805	-437	117	-719	247	-98	-1319	653	-637	-1360	-444	1907	-756	-526	-247	31	74	938	780
206	979	178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-54	-7967	-4931	-732	-1329	-4206	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
215	-241	317	-841	-1014	-698	-290	-77	-589	-225	1258	-211	-827	376	624	-513	476	164	-675	-917	-759
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-9	-7922	-8922	-732	-1329	-4220	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
216	-103	890	-841	-1014	-364	-290	396	-1298	-225	15	-1339	2065	465	-735	-386	-36	287	-542	-917	-140
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-9	-7922	-8922	-732	-1329	-4220	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
217	-456	698	-463	-1014	-698	-290	1171	-791	577	1232	-1339	284	826	-735	-997	-480	-69	-675	-917	-759
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-9	-7922	-8922	-732	-1329	-4220	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
218	135	317	-841	-1014	-202	-290	457	-1298	380	-20	-374	-330	2124	322	-568	-239	-130	-675	-917	-759
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-9	-7922	-8922	-732	-1329	-4220	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
219	-209	317	-841	-1014	-698	-290	-77	-1203	120	1259	-1339	-40	53	332	-242	-240	620	-259	-917	-204
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-9	-7922	-8922	-732	-1329	-4220	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*
220	295	1356	-852	-1026	-376	-302	482	-1309	560	-37	-1350	-37	-564	2178	-253	-532	132	-25	-929	-771
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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221	243	286	-871	-250	-233	-321	1424	-1328	-39	-304	-1369	2037	-327	-74	-551	-440	-666	-184	948	-790
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-2387	-310	-8987	-118	-3672	-4055	-89	-89	*	*	*	*	*	*	*	*	*	*	*	*	*
223	479	285	-384	-617	-234	-322	398	-1329	526	-499	-1370	-530	-653	-177	-222	-356	1809	-185	-949	-335
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-9	-7989	-8989	-732	-1329	-3972	-95	-95	*	*	*	*	*	*	*	*	*	*	*	*	*
224	1607	265	-354	-178	-750	214	1326	-1350	-15	-668	-1391	-446	-674	342	-294	-371	2	-444	-969	-811
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225	1618	275	-883	-39	-112	-174	-120	-745	-5	-210	-1381	-232	-312	290	-308	-208	-366	-274	-960	-801
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226	164	362	747	1509	-752	-2	606	-1351	-46	-846	-1392	-552	-390	-789	-401	-566	479	-62	-971	-181
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-61	-8035	4738	-732	-1329	-3970	-95	-95	*	*	*	*	*	*	*	*	*	*	*	*	*
227	62	269	20	-1062	-746	268	649	1687	-41	-840	-1387	-874	-669	-783	-960	121	536	-91	951	-807
206	979	-178	-352	-36	372	585	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-560	-8022	1653	-732	-1329	-2894	-208	-208	*	*	*	*	*	*	*	*	*	*	*	*	*
228	364	309	-218	-661	-706	-59	1082	-1305	-1	-317	-381	-433	259	-401	-660	-99	-643	95	-925	2192
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-9	-7929	-8929	-732	-1329	-4207	-80	-80	*	*	*	*	*	*	*	*	*	*	*	*	*

229	25	309	-365	744	-706	328	476	-1305	-232	1150	54	-834	-119	-743	-108	385	186	-682	925	-211
-	206	979	178	352	36	372	585	-635	438	-130	677	-164	41	-73	-335	54	27	12	255	-97
-	-103	-7929	-3947	732	1329	-3938	-97	*	*											
230	-44	326	-24	-1005	-689	333	-68	-1289	50	-564	-570	141	356	-91	-988	1535	151	-406	-908	-750
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7892	-8892	-732	-1329	-4217	-80	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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232	-425	348	-737	-984	-667	138	-46	-1267	298	-49	338	-796	-238	245	-237	-387	-296	1661	-886	464
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-7844	-5500	-732	-1329	-3817	-106	*	*											
233	-455	1038	-492	-1013	-697	-50	-76	-1297	552	-123	-1338	-826	-553	-98	1853	574	-12	-390	-916	-758
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-95	-7912	-4068	-732	-1329	-4214	-80	*	*											
234	-96	357	-425	-975	-658	277	676	-1258	-185	-585	-1299	-787	1215	-11	-179	1405	-248	-353	-877	-719
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7826	-8826	-732	-1329	-3868	-102	*	*											
235	-254	322	133	-1010	-693	-285	-72	-550	435	-440	432	130	1892	-730	104	-43	-83	-670	-912	-754
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7901	-8901	-732	-1329	-4213	-80	*	*											
236	-110	322	-836	-1010	-693	-285	-72	-757	1675	-705	90	-342	277	-282	669	291	-382	106	-912	-754
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7901	-8901	-732	-1329	-3832	-105	*	*											
237	-489	284	-874	-1047	-731	-129	273	-514	1871	-826	-1372	-860	832	144	-405	-354	849	345	-950	-792
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
-	-9	-7983	-8983	-732	-1329	-4189	-81	*	*											
238	-275	284	-451	-1047	-731	447	-110	-219	1738	-607	-1372	-860	1104	-335	-685	-194	246	708	950	-792
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
-	-33	-7983	-5767	-732	-1329	-4189	-81	*	*											
239	-235	768	-863	-578	-720	1405	618	-793	680	-333	-1361	-420	-247	-740	-145	832	-657	-469	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7960	-8960	-732	-1329	-4198	-81	*	*											
240	-264	295	-863	-1036	-720	-100	551	-414	200	28	-1361	-500	228	130	50	1348	-165	135	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7960	-8960	-732	-1329	-4198	-81	*	*											
241	136	396	-863	-678	-93	160	606	-857	567	-814	-451	-848	183	-541	-407	-94	1844	-696	-939	-781
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-30	-7960	-5897	-732	-1329	-3932	-98	*	*											
242	322	281	-877	-537	-107	237	632	-629	-209	-205	-1375	-756	-257	-771	-717	73	1861	-447	-953	-795
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-20	-7991	-6679	-732	-1329	-4191	-81	*	*											
243	-60	286	-93	-1045	383	-321	-108	-1328	87	-8	-284	-857	-653	-316	1666	734	-160	-368	-948	-790
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-7980	-5572	-732	-1329	-4125	-85	*	*											
244	40	1010	-435	-1038	-721	-313	401	-1321	96	-240	-1362	-500	306	-758	-593	-491	-32	1549	-940	1285
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7964	-7849	-732	-1329	-4178	-82	*	*											
245	206	294	-864	-678	-721	-265	1122	-653	311	-225	-1362	1738	-645	-758	474	206	-82	-302	-940	-782
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-	-9	-7965	8965	732	-1329	-4205	-80	*	*	407	288	-1362	-416	545	520	221	1419	14	697	940	174
246	479	294	-819	-277	-44	313	23	-1320	*	438	-130	-677	-164	41	73	335	-54	27	12	-255	-97
-	206	979	-178	352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*	*
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247	194	295	-862	1036	318	-312	-99	-635	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
-	-9	-7961	-8961	-732	-1329	-4149	-84	-1321	-635	-247	-560	-1362	-103	-645	77	-358	197	-348	-375	-940	1457
248	1429	294	-854	-1037	202	-31	293	-1321	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
-	-9	-7963	-8963	-732	-1329	-4200	-81	-1204	-635	649	-285	-1362	1796	435	-309	-4	-82	-207	-697	-940	-782
249	-114	294	-864	-1037	-721	222	1147	-1204	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
-	-9	-7963	-8963	-732	-1329	-4200	-81	-1321	-635	*	0	-1362	-419	-184	-758	-1020	95	877	-238	-940	-782
250	1433	767	-864	-1037	-97	-266	-100	-1321	-635	357	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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251	815	137	-1020	1153	-878	-191	215	-810	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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252	317	710	-1028	-623	-886	-266	508	-1466	-635	299	-730	-1526	-1014	-809	-923	1126	424	1640	-862	-1105	316
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253	-657	117	-611	-1215	-544	-116	1176	-831	-635	-425	442	-1539	-706	-56	1998	-581	476	-53	103	-1117	-959
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255	347	100	-970	-893	-915	-183	-294	-1497	-635	-12	425	-1556	107	-839	-435	-460	-281	1570	-383	-1134	1364
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256	128	100	-318	-711	-508	-182	795	-1515	-635	-76	509	-1556	-1044	-839	-47	444	1464	-356	-440	-1134	-976
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258	-322	816	-1058	-708	2096	-343	-294	-1515	-635	-442	1051	-1556	-937	-164	-952	159	-461	122	-365	-1134	-976
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-	-7	-8352	-9352	-732	-1329	-4052	-90	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
259	-40	1351	-1058	-874	1090	12	-294	-989	-635	-442	30	-271	959	-510	1701	-136	-579	-88	-824	-1134	-976
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260	-603	122	507	-1209	-893	-485	-272	-692	-635	-234	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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-	-82	-8310	-4254	-732	-1329	-4071	-89	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
261	-410	161	-76	-1170	-854	-446	-233	-1453	-635	-1107	651	-1495	-581	-58	1766	-830	-89	-36	-416	-1073	-217
-	206	979	-178	-352	-36	372	585	-635	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	-24	-8236	-6258	-732	-1329	-4104	-86	-635	-635	*	*	*	*	*	*	*	*	*	*	*	*
262	-604	2587	-988	-826	-164	-437	-224	-790	-635	1522	264	-525	-974	-683	250	-619	-416	97	146	-1064	-799

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-	206	979	178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-43	8220	5276	732	-1329	-3896	-100	*	*											
263	604	1340	337	626	-845	-437	154	781	48	-544	520	-105	1587	-165	-1144	-608	-783	503	-1064	1124
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	7	-8221	-9221	-732	-1329	-3642	-120	*	*											
264	-329	1155	-447	-786	-398	-477	450	-1484	305	1018	-764	144	-388	-399	806	-561	-534	-6	-1104	670
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-32	-8295	-5753	-732	-1329	-3930	-98	*	*											
265	-439	134	-1023	-683	-881	-473	-260	-509	1856	869	-1522	-1009	-742	-33	220	141	-818	-441	-1100	-942
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8287	-9287	-732	-1329	-4077	-88	*	*											
266	134	713	-188	-674	-257	-164	-260	-475	10	717	-1522	90	703	-702	-1180	1068	-818	-575	-1100	-942
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-90	-8287	-4132	-732	-1329	-4077	-88	*	*											
267	-113	177	-50	-1154	25	333	-217	-1438	193	-769	-114	-967	-434	-228	-478	704	1655	-165	-1057	-346
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8204	-9204	-732	-1329	-3569	-127	*	*											
268	-306	126	-596	1018	148	-481	-268	-1488	224	-823	-1530	-1017	-812	-715	-6	1143	250	647	-1108	-21
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-7	-8302	9302	-732	-1329	-3996	-93	*	*											
269	-652	121	-1036	-279	1366	-275	1934	-1059	295	470	-1534	-354	-552	-931	178	271	232	-542	-1113	-954
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-43	-8311	-5252	-732	-1329	-4065	-89	*	*											
270	-418	140	-1017	-1191	-875	290	912	-579	85	-52	-1515	22	967	-491	611	373	1074	-851	-1094	-935
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-108	-8275	-3858	-732	-1329	-3846	-104	*	*											
271	-601	1342	-985	817	-843	-435	-222	-595	-139	96	-1483	-971	-766	-880	744	298	440	853	-1062	-351
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-196	-8212	3016	-732	-1329	-3619	-123	*	*											
272	-555	219	275	-229	1084	-389	745	-1396	768	1197	-1437	-925	-720	-746	-562	-418	-734	-562	-1016	207
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-8	-8119	-9119	-732	-1329	-4135	-85	*	*											
273	-24	219	-939	676	-51	-389	206	542	-93	692	-1437	-307	-720	-419	507	-409	-386	-773	-1016	593
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-32	-8119	5783	-732	-1329	-4135	-85	*	*											
274	-199	1740	-927	831	-285	-377	2043	-548	983	274	-1426	-913	-708	-822	502	-242	-722	-345	1431	-292
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-49	-8095	-5064	-732	-1329	-4145	-84	*	*											
275	-65	250	-907	-1081	1463	-357	-144	1214	1192	-325	-1405	-465	-688	-802	120	-783	137	-741	-984	-826
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-	-191	-8054	-3053	-732	-1329	-4160	-83	*	*											
276	-438	1587	-822	-996	887	-271	-58	1276	1245	-352	-1320	-808	-603	-716	-978	-391	-308	-656	-898	834
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-7872	-5476	-732	-1329	-4223	-79	*	*											
277	-424	349	-809	-941	447	-258	-45	-171	300	358	-1307	-794	-590	-56	937	-486	-604	-359	3009	75
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7843	-8843	-732	-1329	-4233	-79	*	*											
278	-424	853	406	-31	-666	-258	-45	124	1048	-513	-1307	-794	-590	-703	-227	-460	1197	-642	1435	-171
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7843	-7971	-732	-1329	-4233	-79	*	*											

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279	-287	1126	807	-622	448	-257	-44	157	161	981	-1306	-793	-588	-702	-60	-683	413	464	-884	-726
-	206	979	178	-352	-36	372	585	-635	438	-130	-577	164	41	-73	-335	54	27	-12	-255	-97
-	-9	-7841	8841	-732	-1329	4235	79	*	*											
280	-82	1521	-807	-457	1554	-257	-44	-1264	78	-539	-1306	60	-588	-702	-539	401	237	-215	-884	1286
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-146	-7841	-3446	732	-1329	-4235	79	*	*											
281	26	409	-748	-71	716	-40	1497	-1205	-132	502	-1246	-734	-529	1604	-905	-624	-294	-582	-825	91
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7704	-8704	-732	-1329	-3740	-112	*	*											
282	-172	1067	407	-97	12	-257	2304	-829	-191	404	-1306	-793	-588	-54	-485	-485	-249	136	-884	-170
-	206	979	-178	-352	736	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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283	716	762	-807	443	373	-63	1204	-1264	-191	-248	-1306	-793	-193	-702	-566	-419	1344	-641	-884	-726
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7841	-8841	-732	-1329	-4235	-79	*	*											
284	342	1602	384	-391	-665	-234	-44	-416	-18	1018	-1306	-793	-588	-702	-60	-55	458	-641	266	-726
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	9	-7841	-8841	-732	-1329	-4235	-79	*	*											
285	423	350	807	-981	-665	-257	458	-1264	-191	408	-1306	-793	347	1361	1090	-683	-602	768	-884	77
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-55	-7841	-4919	-732	-1329	-4235	-79	*	*											
286	-403	370	203	-557	-17	-237	749	-710	713	-340	-1285	1452	-216	-682	-852	-663	-582	99	-864	-706
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7795	-8796	-732	-1329	-4035	-91	*	*											
287	-403	1146	-787	941	-17	-237	1143	-815	652	776	-1285	-773	-173	-682	19	-663	271	621	864	706
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-10	-7795	-8796	-732	-1329	-4035	-91	*	*											
288	-423	1750	-564	-934	-665	-257	-44	157	-191	40	814	167	-32	513	364	-470	602	541	884	1614
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-9	-7841	-8841	-732	-1329	-4235	-79	*	*											
289	-423	1396	858	1097	-665	-257	78	-745	602	-504	-1153	-387	280	-702	-350	-560	-404	-641	1903	-726
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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291	-423	2694	-807	-158	-665	-257	-44	-51	-191	49	2225	-793	-304	-702	343	-683	31	-641	-884	-726
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-36	-7841	-5601	-732	-1329	-4235	-79	*	*											
292	-81	1020	225	-678	742	-245	1216	-761	195	98	647	-781	-576	-45	1178	-428	-579	-629	-872	-714
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7815	8815	-732	-1329	-4243	-78	*	*											
293	-254	362	1241	357	-91	-245	-32	-1160	1093	130	-1294	-781	-576	-42	-469	-490	-138	-345	351	-714
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-80	-7815	-4336	-732	-1329	-4108	-66	*	*											
294	-393	381	749	-220	719	-227	-14	-879	-106	362	-1275	-763	-558	143	1352	-283	-262	-611	-853	-695
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-38	-7775	-5552	-732	-1329	-4090	-87	*	*											
295	-396	377	435	-592	-638	-230	2599	-530	-164	-220	-613	-766	-561	468	414	262	-575	-291	-857	-178
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

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296	-10	-7782	8782	-732	-1329	-3960	-96	*	-191	1151	-395	-793	-588	184	-964	180	-223	299	884	726
	-287	350	807	-981	-230	-257	1370	593	-438	-130	677	-164	41	-73	-335	54	27	12	255	97
	206	979	-178	-352	-36	372	585	-635	*											
	-9	-7841	-8841	-732	1329	-4235	-79	*												
297	-423	1399	1229	-426	-665	-257	-44	310	-191	485	-234	-793	-167	-252	-964	430	-602	-641	-884	124
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	-2035	-408	-8841	-177	-3111	-2838	-217	*												
298	-242	2365	-275	-374	-732	-324	629	1530	-258	-60	-1372	-378	-655	299	-1031	-750	202	-293	-950	-792
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-9	-7993	-8993	-732	-1329	-3841	-104	*												
299	91	250	-907	563	-140	-357	-144	-1364	74	187	2654	-893	-159	-281	-580	-783	339	-741	-984	-38
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8061	-9061	-732	-1329	-4176	-82	*												
300	-276	250	-818	321	523	-41	363	-1364	52	530	2654	-893	-688	-351	-655	-484	-115	-741	-984	-826
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8061	-9061	-732	-1329	-4176	-82	*												
301	-523	3358	-907	-351	-765	-357	-144	-896	121	395	-1405	-463	-191	89	269	-783	-702	-121	-984	523
	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-26	-8061	-6128	-732	-1329	-4176	-82	*												
302	93	1430	-899	-74	-756	-348	277	333	97	-602	981	-884	-680	-793	170	1414	-694	-732	-975	-295
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
303	52	259	-899	-1072	-78	-348	346	-1355	749	-525	3252	-491	-596	-125	-1055	-530	-443	-402	259	-262
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
304	100	832	316	-290	282	-348	-135	371	-282	-629	-1397	-884	-680	-793	-578	-774	-381	18	-975	2517
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
305	-514	981	-474	-1072	-347	1503	-135	-180	373	-438	-1397	-387	-680	98	275	-774	-694	-732	2305	447
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
306	-514	259	-899	-1072	-316	-348	1553	1715	-66	-850	440	-534	-680	299	-578	-470	351	247	680	-817
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
307	-165	3547	-899	-780	-252	-348	428	-925	-282	268	545	-884	-680	-18	-629	-774	654	-732	-975	-817
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
308	52	259	491	-548	965	-348	373	-919	2025	-312	-1397	-884	-680	-793	-1055	-774	-241	-732	-975	-361
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
309	-514	259	-142	805	-260	-348	-135	-1355	322	-57	-1397	-884	-680	817	-629	-774	-381	1572	-975	-817
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
311	-514	259	-899	-1072	307	-348	605	-834	92	336	-586	1863	-680	-18	36	-159	549	-732	-975	-817
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-8	-8044	-9044	-732	-1329	-4183	-82	*												
312	-514	259	-463	-250	-756	-348	-135	1692	322	-140	1255	30	-680	-370	-205	-774	428	-732	-975	-817

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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	-54	27	-12	-255	-97
-	-	-8	-8044	-9044	-732	1329	4183	-82	-	-	-	-	-	-	-	-	-	-	-	-
313	-514	1770	1726	538	357	-348	-135	-640	-282	-512	-335	-884	-680	57	-109	-774	-165	-58	-975	-817
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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314	260	824	-899	-66	-756	-348	1523	-378	-282	1040	-1397	-396	-680	1077	-163	-774	-403	-732	-975	-257
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-	-8	-8044	-9044	-732	-1329	-4183	-82	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	206	979	-178	-178	-352	-36	372	585	-635	438	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-5	-8788	9788	9788	-732	-1329	-3847	-104	*	*	2455	-288	-1800	-1288	-1083	-9	-1458	-294	1271	-799	-1378	-1220
361	-917	-144	-920	-920	-1061	-710	-751	561	-1233	2455	2455	-288	-1800	-1288	-1083	-9	-1458	-294	1271	-799	-1378	-1220
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	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	-12	-255	-97
	-	-5	8788	-9788	732	-1329	3847	104	*	*											
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	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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	-	-29	-8788	-5833	-732	-1329	-3847	-104	*	*											
365	-	903	-130	-1287	-787	-1145	-737	-524	2379	-2	-98	-1785	-787	-1068	1699	-1444	-223	-1082	-484	-1364	-743
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366	-	903	-130	-976	-1461	-704	-257	-156	-1264	2446	-988	-1785	-1273	-1068	-1182	-646	-427	-1082	9	-1364	2188
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368	-	288	-130	-364	2230	-651	-483	-524	-189	-671	-234	-1785	-838	-1068	-665	-1040	1007	-1082	-1121	-1364	-1206
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371	-	378	44	2641	-254	-258	-563	-350	-1570	281	-440	-1611	181	-566	-1008	-838	989	908	947	1190	110
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
	-	-6	-8461	-9461	-732	-1329	-4025	-91	*	*											
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373	-	712	62	-1096	-547	-954	-546	-333	2531	-215	-1048	-1594	-655	808	-218	-261	-698	-534	-422	-1172	-1014
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	-	-1275	-8364	-776	-732	-1329	-4070	-89	*	*											
375	-	129	644	-514	-688	312	37	250	448	334	65	-1012	-500	262	-408	-670	556	-309	286	-590	-432
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-	-103	-7069	-4020	-732	-1329	-2036	-403	*	*											
376	-	656	118	-1040	-1214	-446	-489	-276	304	-424	-740	-716	-1026	354	-934	-1196	-915	-217	-874	-1116	3410
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	-	-71	-8327	-4470	-732	-1329	-4086	-88	*	*											
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378	-	300	152	-1006	-838	335	-456	-243	-992	-390	-958	-1504	-547	-787	-901	-810	2329	-801	-391	-1082	490
	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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384	-364	152	-571	-1180	-864	65	-243	-1463	2664	-446	-124	-992	-457	-526	-731	-882	-448	-840	-1082	-924
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-	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

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140

10	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	961	-143	-405	-124	-44	-83	-325	-167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-33	-6059	-7059	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
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14	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
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15	136	909	-249	-422	-106	302	515	-706	367	-201	-747	-235	-30	1063	-405	-124	-44	-83	-325	-167
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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DESC			
LENG 215			
ALPH Amino			
RF no			
CS no			
COM [converted from an old Plan9 HMM]			
NSEQ 0			
DATE Mon Mar 8 11:47:41 1999			
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NULT	-4	-8455	
NULE	595	-1558	85
HMM	A	C	D
	m->m	m->i	m->d
	-3313	*	-153
1	-2006	-395	833
-	206	979	-178
-	-1	-11422	-12422
2	-2512	-2622	185
-	206	979	-178
-	-13	-11877	-6880
3	-2529	-2893	701
-	206	979	-178
-	-22	-12166	-6060
4	-1115	146	-193
-	206	979	-178
-	-11	-12277	-7063
5	-805	-1610	-949
-	206	979	-178
-	-7	-12360	-7700
6	-1573	1857	-354
-	206	979	-178
-	0	-12442	-13442
7	-1154	-990	-531
-	206	979	-178
-	0	-12469	-13469
8	-2279	-778	-994
-	206	979	-178
-	0	-12521	-13521
9	-828	-1362	94
-	206	979	-178
-	0	-12530	-13530
10	-2068	-1459	-138
-	206	979	-178
-	-21	-12545	-6134
11	-1043	-3242	-394
-	206	979	-178
-	-8	-12531	-7634
12	-1714	-1113	1151

NY02:195699.1

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-335	-54	27	-12	-255	-97
-	-31	-12525	-5577	-732	-1329	-4442	-68	*	*	*	*	*	*	*	*	*	*	*	*
13	-1264	136	918	-561	-15	-297	419	137	-3772	601	-4887	1608	192	135	-208	-243	419	-4165	1355
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	255	97
-	-26	-12520	-5795	-732	-1329	-5095	-43	*	*	*	*	*	*	*	*	*	*	*	*
14	-373	-1470	496	-1379	19	-994	-90	1659	-512	-711	-237	1034	-115	-1475	94	6	-930	751	-2528
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-	-10	-12512	-7248	-732	-1329	-4888	-50	*	*	*	*	*	*	*	*	*	*	*	*
15	-1272	679	703	-1683	-767	-1996	-288	258	-1276	819	-643	1212	1080	-2558	203	177	-1152	519	-1229
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	-97
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17	-636	301	660	-862	-484	-555	-710	290	-1226	391	-371	531	461	-3462	-168	45	-1037	48	4464
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18	-617	-38	1962	239	-2921	-1525	1445	-365	-938	-667	-3116	-893	1504	-996	-414	-2129	-1306	-1	4436
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	97
-	-10	-12489	-7206	-732	-1329	-6175	-20	*	*	*	*	*	*	*	*	*	*	*	*
19	-825	-1074	1048	-148	-472	-777	2286	162	-834	-539	-1417	-341	431	-769	-1816	163	58	-844	-1727
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20	-1195	-246	1258	164	651	-1087	1088	-966	-1158	-491	-4879	558	-871	-996	1208	973	898	-887	-2538
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	-97
-	-15	12511	-6626	732	1329	4470	-67	*	*	*	*	*	*	*	*	*	*	*	*
21	620	1282	131	1614	909	1590	1436	-386	-838	-621	-4904	-631	-299	-1089	2275	883	-317	427	-4482
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	-97
-	-36	12538	5352	732	-1329	5480	-31	*	*	*	*	*	*	*	*	*	*	*	*
22	-1116	-3227	-242	-789	-2054	1452	-386	247	556	-1096	-1223	-1543	-670	-1128	1280	434	-301	1841	-4461
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	-97
-	-26	-12516	-5818	-732	-1329	-5100	-43	*	*	*	*	*	*	*	*	*	*	*	*
23	-880	714	-1152	-491	-2311	-493	291	1027	175	62	-1882	260	-1363	-963	1661	-482	-2215	929	-914
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-	185	947	-125	-333	-66	374	568	-599	415	-145	-677	-128	68	-82	-352	-30	18	-27	-281
-	-6890	-20	-7519	-3284	-156	-5566	-31	*	*	*	*	*	*	*	*	*	*	*	*
25	-133	-2277	1982	-431	150	-122	-851	-739	-1897	-1972	145	833	-1684	-2426	-2758	929	-303	-1374	-4492
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-54	27	-12	-255	-97
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26	-284	-3351	798	-1685	418	-999	-2422	1316	-1225	-1932	-109	227	-1913	-2486	-4665	746	-1329	-1791	-4585
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27	-1004	-94	995	-1807	-85	-946	116	2124	-738	-2295	131	1412	-1562	-2505	-2078	-1412	-844	-580	369
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28	957	-1878	-1009	-1818	-683	-500	785	1258	-1489	-2359	-267	2198	-933	-570	-1096	-1557	-1968	-1694	-1138
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29	1778	-1321	-553	-2589	-825	-715	-1865	1570	-1655	-2267	-121	1696	-1454	219	-2064	-385	-929	-1060	623	230
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30	952	-1886	-417	-1340	158	-1027	-1444	-1349	-187	-1345	-194	2335	-1599	-192	-879	861	-1545	-1754	111	1195
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31	1004	-2448	-1129	-1391	754	-114	-380	218	-620	-1989	-1407	618	64	-23	-485	-195	-434	-777	1483	2065
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
-	-16	-12695	-6515	-732	-1329	-5244	-39	*	*	*	*	*	*	*	*	*	*	*	*	*
32	-1308	-165	-836	-641	-357	-312	-373	1476	288	-1423	34	569	489	220	-495	175	-2376	-92	306	1540
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33	-1333	-3377	892	-1368	815	-493	-2831	1114	106	-873	1054	135	236	183	326	-1421	-355	-167	-4612	1414
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34	-182	-770	395	-213	-2090	1200	-419	689	-269	-849	1452	351	618	-689	-851	-720	-1547	-99	382	-107
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-	-12	-12669	-6966	-732	-1329	-5604	-30	*	*	*	*	*	*	*	*	*	*	*	*	*
35	-461	-1432	1131	163	159	443	266	-882	-343	-2085	-854	-371	671	-893	-260	-431	480	-1762	-1110	2092
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-	-15	-12661	-6602	-732	-1329	-5239	-39	*	*	*	*	*	*	*	*	*	*	*	*	*
36	17	-3354	-153	-181	192	1079	-131	-207	549	-3400	-365	185	-215	920	-493	-80	-412	-1817	-485	1604
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37	-95	-2407	-1716	112	-296	235	1049	-164	-237	-2199	-1035	113	694	1272	-580	-760	-175	-433	656	1978
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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38	-174	338	-211	-1406	951	-492	-1270	235	1210	-4022	-848	351	710	395	1553	-485	23	-1439	408	748
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-	-16	-12654	-6484	-732	-1329	-4616	-60	*	*	*	*	*	*	*	*	*	*	*	*	*
39	-111	243	-56	-941	88	-58	-467	-565	797	-575	-1630	420	301	1401	767	-209	-115	-1650	-1092	-56
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40	742	-1202	-796	-841	598	-1013	-642	-171	596	-2648	-367	-67	363	1484	-228	-196	73	-1277	1379	1136
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-	-15	-12657	-6570	-732	-1329	-4139	-84	*	*	*	*	*	*	*	*	*	*	*	*	*
41	-183	-808	-1023	-217	947	-771	168	850	-130	-1164	-106	268	-131	157	-194	-890	-334	-1099	1598	2085
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42	635	271	-1145	-275	-71	-1001	-1626	1987	-972	-542	1270	-3702	-227	545	-2845	-1190	350	-869	717	768
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43	1432	596	-2062	-1453	322	-286	-1715	929	-2064	-489	897	-2401	-109	707	-4699	-2245	708	-30	368	1246
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44	938	759	-1564	-835	-1721	-754	-422	1475	-1905	-1226	474	-1141	414	1281	-2400	-1224	1569	-768	1127	-966
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45	831	-591	-384	903	-1220	32	-250	-466	-1603	-1030	-1663	-1152	-125	2493	-4699	-1913	1275	-41	1370	-1514
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47	-1991	856	-969	-954	-734	669	241	-1817	-258	-258	-270	201	-1029	2099	2045	-2870	-1172	-439	-1270	2021	-4482	
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62	-2704	791	-2319	1058	-3714	-525	-131	-509	127	-1926	1360	521	-2839	1424	-775	-163	-37	497	3129	661		

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66	-358	1781	-1090	-154	-4537	-1459	-2405	521	-1900	-75	417	-699	-1579	-145	-901	172	744	1796	1263	86
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-	-19	-12825	-6297	-732	-1329	-5076	-43	*	*	*	*	*	*	*	*	*	*	*	*	*
67	-834	247	-2173	-418	-1922	-2328	-128	1809	115	-401	1959	-1079	-1441	-23	-1315	-1181	847	1109	1239	-366
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68	-912	894	-1885	590	-1112	-721	-1361	1069	-1587	287	1811	-446	-4456	-1015	-1522	-1311	-117	1611	1253	463
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-	-2	-12821	-9393	-732	-1329	-3757	-111	*	*	*	*	*	*	*	*	*	*	*	*	*
69	-465	-209	-1356	-465	-1881	-910	-1870	525	-88	153	2828	-1408	-1763	-551	-179	-1774	300	1295	612	351
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-	-14	-12847	-6676	-732	-1329	-4508	-65	*	*	*	*	*	*	*	*	*	*	*	*	*
70	-1405	1181	-2361	-134	-2712	-1051	-3931	239	-202	656	2019	99	-513	-416	260	-1156	268	1160	963	-1053
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-	-7	-12841	-7721	-732	-1329	-4147	-84	*	*	*	*	*	*	*	*	*	*	*	*	*
71	-1467	908	-2720	369	-2397	-588	-1244	-1682	299	-105	2607	-283	-630	-1074	521	-417	1442	294	410	379
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72	2421	1682	-932	1021	-1849	-500	-3910	-678	691	219	603	357	-869	-149	640	-1039	901	234	308	2237
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-	-18	-12818	-6333	-732	-1329	-3788	-108	*	*	*	*	*	*	*	*	*	*	*	*	*
73	-837	1377	-344	1505	-541	-299	-1848	-1910	726	232	-116	103	-390	-347	-656	-940	707	170	-4762	-919
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
-	-10	-12832	-7280	-732	-1329	-4113	-86	*	*	*	*	*	*	*	*	*	*	*	*	*
74	-1424	1877	58	1719	-1332	-222	-1045	-1189	1011	-190	-1421	-652	-2085	888	441	-870	-1257	-128	-1279	-1483
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-	-22	-12842	-6071	-732	-1329	-4809	-52	*	*	*	*	*	*	*	*	*	*	*	*	*
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76	-1031	1169	-358	1056	-675	267	-52	-2185	1207	-2122	-342	-697	-2543	615	1501	-1408	-1695	173	1421	188
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-	-83	-12813	-4172	-732	-1329	-3423	-141	*	*	*	*	*	*	*	*	*	*	*	*	*
77	-1830	1015	-272	981	-924	778	-639	-2217	903	-2812	-1705	526	-455	907	538	-564	-806	-610	752	1348
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78	-733	922	-712	55	-1738	409	-1307	-2303	1490	-1210	752	-1160	-958	494	797	-870	-410	-365	2564	759
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-	-15	-12796	-6587	-732	-1329	-3325	-152	*	*	*	*	*	*	*	*	*	*	*	*	*
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-	-7	-12861	-7781	-732	-1329	-4186	-82	*	*	*	*	*	*	*	*	*	*	*	*	*
83	-960	2630	-184	572	-78	-796	-255	-1168	-679	-2023	-736	-1591	825	1119	-197	-723	-588	-948	2545	1573
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86	-1961	-155	-1180	356	-2838	-790	-936	-906	-538	-1012	-980	62	1877	-24	-209	-1409	-96	-921	2867	2276
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87	-763	-45	981	662	-995	435	-1000	-1597	176	-1141	-2322	-1424	882	-757	-238	-238	23	-667	3084	126
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89	-302	-1057	-446	1077	-471	911	240	-659	153	-934	-475	113	-1099	337	70	-331	85	59	-1996	284
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90	-1433	99	-876	341	-242	633	360	-514	361	-1143	-554	-1276	-1245	247	100	-27	1009	599	623	739
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91	-638	-2583	-739	106	297	-282	489	-231	-495	-636	358	-110	-871	-821	-157	-373	960	303	-4754	2162
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92	-1480	20	-503	-649	21	1122	869	121	-613	-757	-696	432	-1775	323	353	-757	399	23	-4762	1625
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93	-2350	1019	677	-822	447	345	1187	-129	139	-1183	695	-460	-2106	-120	-1229	-675	-283	898	-1235	1867
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94	-2120	269	845	-724	85	149	-459	1251	423	-1011	324	-1246	-1874	192	-173	-1107	500	848	-2780	423
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95	-1911	-194	-708	485	129	-2851	-531	694	188	191	589	148	-1235	-14	372	-422	793	840	1483	470
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-	151	921	-169	-296	-41	337	600	-613	433	-150	-685	-141	14	6	-255	-60	56	-10	-247	-97
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133	-335	-915	-176	-1353	1011	-40	-36	506	40	1276	325	-196	142	-849	-445	-294	-1503	300	-4984	-3057
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134	-2	-1716	-64	-717	1566	-2186	428	328	281	641	-706	-166	-764	176	267	-883	-386	-7	587	-988
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141	-789	1486	63	-164	-444	263	1183	-830	443	-532	-1644	-697	558	1108	651	124	-192	-656	-4919	-1740
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167	152	1383	318	-205	-4530	-749	-1787	180	-576	445	2371	-361	-2569	282	-1082	110	-95	82	-465	-589
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168	-599	1045	-816	22	-2435	-1663	661	764	-212	983	2145	-1009	-4452	-624	357	-1116	-524	775	-941	-1648
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-	-12	-12817	-6975	-732	-1329	-5662	-29	*	*											
169	-576	574	440	560	-1875	-805	-1940	31	-448	868	642	611	-2086	801	-102	-1823	-1253	1032	-4735	-1003
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-22	12804	6083	-732	-1329	4601	-61	*	*											
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-	-13	12795	-6778	-732	-1329	5692	-28	*	*											
172	-17	183	-132	-27	-390	682	637	402	764	-283	1160	-282	-3709	675	1355	-910	-1486	10	-4712	486
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	0	-12780	-13780	-732	-1329	-3962	-96	*	*											
173	-299	-693	247	718	-609	-262	-960	603	-29	-494	752	-678	-526	822	843	-517	-563	-190	-4736	367
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-	-15	-12806	-6608	-732	-1329	-5070	-44	*	*											
174	-1758	428	325	1173	-390	120	486	-378	1038	-1869	-1222	44	-342	262	957	-1318	33	-242	-4728	-106
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-6	-12797	-8080	-732	-1329	-4235	-79	*	*											
175	-767	188	-179	719	-450	868	853	-765	503	-1815	-635	115	-713	691	60	-698	-565	217	-1295	1093
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176	-825	607	570	1090	648	23	341	126	274	-637	-708	-1387	-1236	690	-341	-757	-752	633	-4730	-352
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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182	-490	609	-3935	-437	1522	-625	-229	551	-1530	280	90	-631	-1644	517	143	-786	656	-179	-1328	1522
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183	-967	1411	-300	-1070	439	180	822	129	-2071	-9	646	-624	-1257	1501	-144	-1977	-787	1437	-4757	-379
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184	-347	707	-1931	894	-930	-1831	230	-885	97	-102	604	-519	-2820	1157	1167	-73	-217	747	-4735	-363
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-	-15	-12804	-6663	-732	-1329	-5004	-46	*	*	*	*	*	*	*	*	*	*	*	*	*
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187	-1180	979	-502	-617	598	1704	-619	-710	-291	-17	1539	-2582	-1154	240	2381	-1534	473	37	-4728	-113
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188	186	442	-463	764	386	-1509	635	-313	-893	585	1623	-1471	-1728	1098	1606	-716	-931	-307	-4720	-87
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189	-1272	-149	-94	-14	-1679	-787	254	-1992	-1410	-1713	566	-430	-2156	2316	2317	-467	-824	-665	-4728	64
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190	-263	-1217	-1747	-745	-2093	-895	-362	-1109	-578	-962	1291	63	-818	1422	2318	-383	387	-1274	-4705	398
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191	65	1578	-926	-1317	-582	571	-200	-864	-1156	-1519	645	-440	728	1707	900	-11	-623	-461	-1886	267
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192	368	-823	-2916	-122	183	785	74	-161	-530	-195	1283	-66	-663	882	1069	-618	-746	-360	-4662	-741
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193	-958	352	-1201	-524	-359	-465	-198	388	-1667	-234	2820	434	432	513	-2904	-772	-833	877	-4681	494
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194	-28	-1500	-2519	440	-443	-980	150	219	-3085	-1147	1620	-791	-2720	1625	-2878	-1223	-106	1742	404	976
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195	-971	-2458	-654	-426	-28	-4003	-624	187	-788	-2248	2259	-378	-2005	2439	-1764	-2641	941	837	-294	843
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-	-	-95	-12221	-3980	-732	-1329	-5265	-38	*	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97	
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207	-	498	1706	-374	368	-3117	-1673	-216	792	-268	773	475	-1114	-3705	618	-1114	-2160	-517	701	-4000	795		
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210	-	-573	-1108	-1848	961	783	-389	-56	-1678	-980	1331	-1028	-804	-3196	-347	-2627	-1069	-1088	229	977	2035		
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211	-	322	419	-1235	1291	-68	-602	-1900	1273	352	-106	-325	-798	-3081	-654	-606	-790	-483	-978	1748	532		
-	-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	73	-335	-54	27	-12	-255	-97		
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212	-	261	1991	75	400	-2856	1005	-1602	363	1325	307	606	-2046	-2780	153	-2225	-2874	-441	879	-64	1462		

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-	205	983	-180	-350	-37	375	584	-637	440	-131	-677	-163	40	-74	-336	-55	27	-14	-256	98
-	-4649	-467	-2078	-45	-5027	-7221	-10	*	*											
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-	-246	-8829	-2695	-732	-1329	-7432	-8	*	*											
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-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

//

HHMER2.0
NAME ras-gap.txt

DESC
LENG 219
ALPH Amino
RF no
CS no

COM [converted from an old Plan9 HHM]
NSEQ 0

DATE Mon Mar 8 11:48:16 1999

XT -8455 -4 -1000 -1000 -8455 -4 -8455 -4

NULT	595	-1558	85	338	-294	453	-1158	197	249	902	-1085	-142	-21	-313	45	531	201	384	-1998	-644	Y
NULE	A	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S	T	V	W		
HHM	m->m	m->i	m->d	i->m	i->i	d->m	d->d	b->m	m->e												
1	1128	82	-529	-1249	845	525	-312	317	-459	116	-1573	-1061	-856	824	-1232	-951	1263	-909	854	-993	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-7	-8376	-9376	-732	-1329	-3001	-193	-3419	*												
2	-815	-42	501	-1373	714	414	1587	-1656	-583	-281	-1698	-1185	-981	703	1367	516	-995	-1033	2041	-1118	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-6	-8593	-9593	-732	-1329	-3739	-112	*	*												
3	402	-65	364	446	393	-672	-459	-1680	-606	-275	1287	847	-1004	-1117	-771	-1098	382	304	407	1011	
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-	-5	-8631	-9631	-732	-1329	-3000	-193	*	*												
4	369	160	574	1921	-1175	347	152	-1774	-701	610	-1815	-1303	-1098	-125	-1474	1193	-1112	-1151	1394	559	
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-	-5	-8782	-9782	-732	-1329	-2631	-254	*	*												
5	314	-281	957	-164	482	-888	-675	-1896	-823	280	-1937	-1425	-1220	-1333	221	784	-1234	863	821	716	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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6	654	-395	643	-1727	-1411	-129	1474	-2010	371	917	-2051	216	-1334	-1447	93	-1429	94	717	-1629	-1471	
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7	984	-420	-680	169	-1435	89	817	125	-961	654	-2076	-1563	-1359	-1472	885	284	-1373	348	-1654	-735	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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8	-1193	-420	-1578	-196	993	-1027	-814	425	-961	943	-2076	-1563	243	-326	-335	-924	1348	45	-1654	883	
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
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13	1348	-575	-38	1906	1175	1182	-969	1335	15	1568	-957	-1718	-1514	337	-1889	-1608	69	93	-1809	1651
	206	979	-178	352	36	372	585	-635	438	-130	677	-164	41	73	335	54	27	12	-255	97
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14	-263	-613	449	1945	1442	-1221	-1008	624	215	411	1135	282	-1552	-1666	-1928	-145	472	-76	1098	-626
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	-54	27	-12	-255	-97
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15	172	-613	-1191	396	1569	-110	653	-376	-1155	194	-2269	-303	-1552	803	-95	824	-1041	-1605	-1847	401
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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17	-504	-613	17	918	-159	4	2391	729	876	-99	-2269	-361	-1552	-619	-1279	-941	54	-1605	-1847	-540
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19	-452	-613	-1771	133	-1629	-1221	665	-2228	612	1013	643	-1757	-1552	-1666	1972	-212	-1566	-164	1555	-659
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	-9446	-10446	-732	-1329	-3136	-174	*	*											
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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26	-521	-711	618	-2042	57	-258	-1105	560	-1352	911	876	-1198	-1649	-1763	-2025	338	203	1038	1712	-1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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	-3	-9579	-10579	-732	-1329	-2854	-215	*	*											
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33	1053	-711	-141	1404	-1726	327	-1105	-2325	-647	631	200	-1854	-1649	95	-1573	301	-261	-393	-1945	-1787
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36	3	-711	518	-740	994	-1318	-1105	-2325	923	-606	720	742	-115	100	377	405	-1138	-263	-1945	522
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37	502	1313	1159	-746	-1726	-714	-1105	-1675	-118	135	492	767	754	-902	983	-322	-1070	-689	-1945	-1787
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	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
39	1484	-711	-195	-423	-1726	-476	859	629	-347	-125	-2367	1168	-1649	-27	1	-65	1191	404	1556	1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
40	-1460	-711	-548	425	-516	-1318	-1105	539	-1252	732	1122	-31	-615	199	-2025	463	1412	-1702	-1945	607
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
41	-1484	-8	428	-2042	834	-1318	-1105	385	569	900	1263	-1854	-1649	176	977	-1744	682	-1702	-1945	289
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
42	380	-711	685	-821	1696	-4	-1105	-2325	537	-12	1485	-98	-1649	-1763	1289	-1744	-115	-1702	-1945	-1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
43	-284	1503	-1868	-2042	-258	-288	-1105	306	784	-337	-2367	-11	88	-1763	1399	351	-427	352	1486	-1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-72	9579	-4397	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
44	-381	972	-1818	-1992	-629	840	-1055	-2275	-33	108	677	-91	-1599	353	719	1147	479	-83	-1894	-1736
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9508	-10508	-732	-1329	-2183	-359	*	*	*	*	*	*	*	*	*	*	*	*	*
45	-361	965	-1159	-1181	644	-33	-1105	1262	543	-1371	-2367	1314	-1649	-660	329	226	301	-175	-1945	-1020
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
46	273	-711	-118	-282	-1726	537	-1105	-221	-347	251	598	849	-1649	50	1	781	571	-1702	-1945	-1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
47	616	-711	-118	506	-1726	-258	-1105	-1156	116	426	626	909	-933	-1763	-286	-1209	786	548	-1945	-1787
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
	-3	9579	-10579	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*

48	-3	-9579	-10579	-732	1329	-2854	-215	*	284	-1197	-2367	-1854	-448	1763	219	1496	41	124	-1945	1140
	402	1397	1868	2042	92	-262	914	-253	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
49	-3	-9579	-10579	-732	-1329	-2854	-215	-115	-150	323	-2367	-1854	-395	-1763	-2025	156	962	-263	-1945	573
	72	2786	-259	-2042	790	-124	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	1033	1277	603	-727	-1854	1	283	176	-1744	-1045	-689	1586	993
50	418	-711	-1868	-2042	92	-1318	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	1329	-2854	-215	552	1378	-502	2210	150	-1649	-1132	-2025	745	1422	-1702	-1945	-1787
51	-400	724	-1868	-2042	-1726	-262	914	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-77	-9579	-4306	-732	-1329	-2854	-215	703	728	336	2277	-1800	-1596	99	55	-382	1114	-277	-1891	11
52	-1430	-657	-1815	-686	-837	-1264	698	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9504	-10504	-732	-1329	-3017	-190	176	-1198	515	139	-49	-1596	-174	-1971	-872	692	-1648	-1891	1035
53	124	293	-366	927	1498	-1264	-1051	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9504	-10504	-732	-1329	-3017	-190	293	132	205	-359	-1800	2	571	71	207	350	594	-1891	631
54	-1430	1251	-1815	-159	694	-171	-1051	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9504	-10504	-732	-1329	-3017	-190	9	624	-682	556	-1004	970	-1709	-487	317	1247	-1648	-1891	-164
55	454	104	-1282	-608	1092	-1264	-1051	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9504	-10504	-732	-1329	-2151	-368	2325	521	380	1877	-1854	133	-1763	332	648	202	84	1945	1787
56	-1484	1373	-1868	-2042	725	420	1071	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	2325	1227	668	-2367	-459	509	900	545	-1744	856	424	1945	1740
57	106	471	-1868	-423	-616	-1318	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	957	-347	617	-2367	-1854	-1649	351	664	-311	819	171	-1945	243
58	267	-711	-547	-2042	-678	32	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	348	-641	-121	307	-360	-51	686	173	-1290	-1045	1131	-1945	-88
59	606	1470	1868	423	-1726	760	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	3	-316	-954	598	-1854	-1649	-1763	-134	322	-191	-175	-1945	-1787
60	947	1313	-1868	1295	-1726	954	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	480	577	-98	275	322	-120	923	108	-1744	193	17	-1945	1313
61	-70	-711	-245	-348	-1726	-1018	34	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	1675	-1252	666	-375	-1854	-1649	-50	-583	-284	-1180	1158	-1945	243
62	-1026	1313	1295	-585	-227	547	486	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	1400	-3	-763	-2367	1005	88	60	-214	-1744	-223	146	-1945	2047
63	45	-711	-1868	-444	-238	-1318	-1105	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-3	-9579	-10579	-732	-1329	-2854	-215	2325	1775	1071	-2367	555	-73	8	-2025	-1364	-876	434	-1945	-1787
64	-361	-711	-1868	9	-1726	-1318	1657	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
	206	979	-178	-352	-36	372	585	-635	*	*	*	*	*	*	*	*	*	*	*	*
	-129	-9579	-3567	-732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*

65	24	-619	154	511	-1634	-1226	1824	-199	1429	-383	788	-1763	1558	987	-1088	241	398	1611	1680	1031
-	206	979	178	352	-36	372	565	635	438	-130	-677	-164	41	73	-335	-54	27	12	255	97
-	-91	-9453	4057	732	1329	-3124	-176	*	*	*	*	*	*	*	*	*	*	*	*	*
66	-209	-557	1183	1688	-1572	-619	-8	1040	597	1592	-2213	-1700	1496	162	-1871	-70	52	641	1859	1633
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	97
-	-3	-9361	10361	732	-1329	-3267	-158	*	*	*	*	*	*	*	*	*	*	*	*	*
67	-417	-557	-979	-1888	-1572	-1154	-951	1385	1168	11	-2213	-1700	-1496	537	908	323	1238	-486	-211	-1633
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9361	-10361	732	-1329	-3267	-158	*	*	*	*	*	*	*	*	*	*	*	*	*
68	-1330	-557	1199	-95	-1572	-240	-951	392	637	832	-2213	125	1351	100	-672	-582	-1510	-1548	-1791	-1633
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9361	-10361	732	-1329	-2004	-414	*	*	*	*	*	*	*	*	*	*	*	*	*
69	-876	-652	909	1994	-1668	387	1179	-789	206	765	685	-1796	-97	109	-1264	523	48	106	-1887	-666
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9495	-10495	732	-1329	-2115	-379	*	*	*	*	*	*	*	*	*	*	*	*	*
70	-872	-711	38	372	-1726	-148	-1105	-406	540	1416	-2367	-1854	970	-874	-2025	210	-40	-1297	999	-1787
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9579	-10579	732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
71	215	270	653	-2042	1008	-1318	-1105	1140	-65	-21	-2367	119	-52	856	618	-100	-1333	-633	-1945	-1787
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-65	-9579	4551	732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
72	1439	1358	-1824	161	-1069	-401	568	1222	-1207	999	-2322	-52	1331	-1718	-276	-1699	-1618	538	1439	-1742
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-82	-9521	-4206	732	-1329	-3028	-189	*	*	*	*	*	*	*	*	*	*	*	*	*
73	-1382	-609	-520	1201	-1624	-1216	1101	1163	459	135	-2265	180	-1547	-1661	-425	70	-1561	1114	-1843	-1685
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9442	-10442	732	-1329	-2365	-311	*	*	*	*	*	*	*	*	*	*	*	*	*
74	-262	-655	329	831	-1671	-1263	-1050	1005	647	296	-2311	1207	-1594	198	-1432	-681	-193	163	-1889	-1731
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-88	-9504	-4118	732	-1329	-3021	-190	*	*	*	*	*	*	*	*	*	*	*	*	*
75	-244	-595	628	-328	-141	-1202	-989	961	173	-91	316	238	-1533	-112	-886	-271	-931	1463	-1829	-1671
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9415	-10415	732	-1329	-2289	-330	*	*	*	*	*	*	*	*	*	*	*	*	*
76	-37	779	-1810	873	-651	181	-1047	-12	319	21	1170	-301	191	-1705	-1967	-8	468	220	-1887	-426
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9495	-10495	732	-1329	-2115	-379	*	*	*	*	*	*	*	*	*	*	*	*	*
77	1111	-711	1378	1266	-1726	-1318	974	548	1314	-1820	-2367	-855	-115	229	-1447	566	98	857	-1945	-1787
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-48	-9579	-4990	732	-1329	-2854	-215	*	*	*	*	*	*	*	*	*	*	*	*	*
78	600	1292	-173	516	-110	-1285	-94	493	449	-1787	1484	-65	-1617	-1730	-1394	1208	-189	-584	-1912	-1754
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-104	-9537	-3676	732	-1329	-2984	-195	*	*	*	*	*	*	*	*	*	*	*	*	*
79	-1379	1397	1290	-364	-1621	-1213	-1000	-2220	780	596	-2262	-1749	393	1107	-1920	642	-767	-1597	2612	-1682
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-9440	-4165	732	-1329	-3215	-164	*	*	*	*	*	*	*	*	*	*	*	*	*
80	391	-548	1009	-1365	258	-1156	-943	-2163	388	-709	-2204	1087	325	-193	98	86	-362	587	1522	-1624
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-218	-9363	-2851	732	-1329	-3355	-148	*	*	*	*	*	*	*	*	*	*	*	*	*
81	-1175	-402	730	1110	-1417	276	1524	-2016	504	-186	-2058	-1545	-833	1256	297	320	-1354	-1393	67	-232
-	206	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-4	-9154	-10154	732	-1329	-2999	-193	*	*	*	*	*	*	*	*	*	*	*	*	*
82	-1215	-442	19	-24	-1457	62	1083	634	-983	79	-2098	-1585	-1381	211	-1756	1001	3	936	-1676	791

63	-205	979	-178	352	-36	372	585	-635	438	-130	-677	-164	41	-73	335	-54	27	12	-255	-97
	-208	9211	3915	732	1329	2451	-291	*	*											
	1169	-395	725	741	1026	1002	1123	2010	937	-1505	-2051	-437	1334	-1447	-653	101	823	705	2775	500
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	54	27	12	255	-97
	-48	-9138	4999	-732	-1329	-2047	-400	*	*											
84	-349	511	150	1842	1219	-1118	1199	-146	1070	-752	-2166	170	1198	-480	-1825	824	-1463	-250	-1745	-520
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	9305	10305	-732	-1329	-2436	-295	*	*											
85	-240	1092	-1732	1356	142	-1181	210	-2189	-125	644	-2230	731	-563	-1626	343	818	-124	-1566	-1808	-1650
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-81	-9391	-4242	-732	-1329	-2340	-317	*	*											
86	-1357	2741	10	1522	-934	-1191	-978	942	-1125	234	-2240	-1727	-1522	-14	-107	-156	-1536	280	-1818	-595
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	9409	-10409	-732	-1329	-2379	-108	*	*											
87	-1411	-637	-101	1386	1105	-1245	-1032	-2252	580	23	-2293	962	658	-1690	-1952	594	-128	-350	-1871	-1713
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-52	9481	-4885	-732	-1329	-2599	-260	*	*											
88	-327	-627	568	-263	743	-1235	-1022	349	-1169	711	-2283	913	-874	-1679	-1942	294	551	398	-1861	-23
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	-9466	-10466	-732	-1329	-2290	-330	*	*											
89	-517	678	1418	1059	-1693	-1285	-1072	-291	136	73	659	-333	1024	-1099	-247	-122	-1014	-169	-1912	-1754
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-69	9535	-4465	-732	-1329	-1585	-585	*	*											
90	-959	-737	-1894	100	-1752	-1344	-1131	579	1489	-762	-2393	24	1466	-1789	27	155	591	330	1971	-1813
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-34	9622	-5484	732	-1329	-2785	-226	*	*											
91	461	714	592	267	-1729	-868	-1108	-172	-325	229	1501	853	20	987	-320	-477	519	557	1946	-1790
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	255	-97
	-47	9592	5010	-732	-1329	-2904	-207	*	*											
92	-385	-681	184	-1306	-1696	-1288	-1075	-2296	1832	1123	875	-1825	34	1129	612	-359	-1634	-1673	1915	-1757
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	9549	-10549	-732	-1329	-1901	-450	*	*											
93	-1523	-750	528	1232	-1765	-1357	-1144	-218	-1291	524	-2406	-1893	-71	-1802	323	690	154	792	-1984	516
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	-9641	-10641	-732	-1329	-2143	-370	*	*											
94	-965	-781	-1939	562	-1796	919	-1175	237	1345	7	-2437	309	-220	-121	-1064	-17	-1734	-445	-2015	1262
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	-9681	-10681	-732	-1329	-2613	-258	*	*											
95	-741	-781	573	184	125	-1388	-1175	354	-72	-331	1562	-439	453	27	-2095	812	-1734	613	-2015	291
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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96	-1523	-749	-1907	1088	133	-257	854	-513	1038	-392	-2405	1495	-1688	246	-1359	659	314	-370	-1984	-1825
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
	-3	-9639	-10639	-732	-1329	-2746	-233	*	*											
97	-933	2140	908	-105	133	-1357	-1144	-259	-836	-545	-2405	-325	425	-297	653	868	-1702	856	-1984	-1825
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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99	-1554	-781	-1	436	403	-1388	-1175	763	-1322	50	-2437	1653	-1720	-201	21	35	685	399	-2015	-1857
	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97

-	-118	-9681	-3697	732	1329	-2613	-258	*	-278	-682	-2352	1210	963	858	178	430	483	420	1930	-1772
100	1470	696	240	1234	1478	1303	1090	2311	438	-130	-577	-164	41	-73	-335	54	27	12	255	-97
-	206	979	178	-352	-36	372	585	635	*	*	*	*	*	*	*	*	*	*	*	*
-	-3	-9569	-10569	-732	-1329	-2036	-403	*	*	*	*	*	*	*	*	*	*	*	*	*
101	548	-750	-812	46	76	1357	1083	-466	1335	626	767	714	-841	-274	-2064	-584	150	1741	-1984	-1826
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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102	543	1431	793	1025	296	-1357	-1144	-210	-1291	-216	-2406	1286	-1689	-28	35	118	-939	-214	-1984	-1826
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9641	-10641	-732	-1329	-2143	-370	*	*	*	*	*	*	*	*	*	*	*	*	*
103	-886	-781	-122	274	-328	-328	-1175	-273	797	-379	-635	582	-1720	-1145	1144	1034	90	-711	-2015	-509
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104	162	-781	-1228	-540	-1796	-1388	1415	489	-667	890	145	930	-122	105	-572	103	447	-464	-2015	-1857
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105	-701	-781	-1939	-150	194	-1388	-220	36	-735	1289	625	314	-1720	1125	1026	248	-1734	-617	-2015	-1857
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107	-1554	-781	720	-1059	-213	-278	-1175	-129	-394	592	848	532	-1720	201	-854	1041	-1734	-419	-2015	1512
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-	3	-9681	-10681	-732	-1329	-2613	-258	*	*	*	*	*	*	*	*	*	*	*	*	*
108	-1554	-781	154	1245	23	-1388	-1175	81	-1322	70	2000	-1296	-69	699	513	11	-1116	1368	1331	-616
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	12	-255	-97
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109	1864	-1091	800	1901	99	-444	-1485	-17	-377	-338	524	-469	-2030	-1083	67	-313	82	-1200	141	862
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10125	-11125	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
110	-308	1549	-888	-8	2370	-1698	-1485	-719	383	-770	-2747	-2235	544	-1033	-30	217	-300	117	-2325	-10
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111	-356	1025	-1070	378	-174	-1698	1485	151	-256	679	-745	-2235	2206	-1026	-2405	373	-1187	-1060	-2325	234
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112	-621	-1091	-2249	607	1344	-1698	-1485	-173	-524	-224	922	-2235	2346	392	-272	-2124	179	-739	-2325	-2167
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-50	-10125	-4918	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
113	-14	-1053	390	102	1006	-1660	-486	-178	-1594	-298	-2709	941	-1992	2350	-2367	-705	-437	207	-2287	-43
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-	-2	-10077	-11077	-732	-1329	-43	-5089	*	*	*	*	*	*	*	*	*	*	*	*	*
114	-69	-1091	-2249	-576	1019	-631	454	-777	317	1471	257	-658	-766	-2143	131	-820	-153	-279	1583	-2167
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-	-2	-10125	-11125	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
115	-798	942	99	-790	-183	-1698	-235	992	-305	420	-2747	-1661	-766	-2143	2210	-682	-277	115	-2325	-2167
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-	-2	-10125	-11125	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
116	-425	-1091	182	-2422	842	-844	-1485	870	-228	-924	-2747	-2235	-493	-629	87	1963	-662	354	-2325	-2167
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-47	-10125	-4995	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*

117	-636	1217	851	-1315	-554	1662	379	1227	391	188	2711	2199	-1994	66	-562	287	-2008	1819	1069	53
-	205	979	178	352	-36	372	585	-635	438	-130	677	154	41	73	335	54	27	12	-255	97
118	-522	3549	424	2422	42	-635	1485	-68	-258	571	-157	-2235	2030	-2143	-953	674	-528	-1669	2325	575
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	73	335	-54	27	12	-255	-97
-	-2	-10125	11125	732	1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
119	-605	872	-424	-448	-257	-1125	3148	934	813	-583	-1052	-135	-436	-1090	-2405	966	-61	-704	-2325	-2167
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-	-2	-10125	11125	732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
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-	-2	-10125	11125	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
121	-1484	552	109	-773	-2106	-1186	-1485	-1778	-1633	1760	-62	119	-2030	491	-2405	1162	-2044	-3	-2325	921
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10125	11125	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
122	-1864	1429	-1066	-578	-232	-539	1117	790	-1633	73	658	596	-2030	-2143	-585	134	-1225	-295	-2325	2628
-	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10125	11125	732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
123	-26	552	-1240	279	-343	-1698	-1485	38	-1633	-1300	-2747	128	1286	2474	734	-499	-2044	-559	-2325	-82
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	122	-10125	3636	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
124	1769	1293	480	-2327	-1329	-1603	-1390	-642	-401	151	-2652	-227	776	-224	-2310	420	-56	-451	-2230	-2072
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-	48	-10004	-4965	-732	-1329	-1560	-598	*	*	*	*	*	*	*	*	*	*	*	*	*
125	-1733	1266	-756	195	-1975	-449	-1354	-563	-629	-1497	372	-526	1582	-1139	-2274	-771	1928	759	2194	342
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-	-2	9958	10958	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
126	-602	3814	-2117	-2291	439	-450	1229	246	-143	40	941	-2103	215	405	-2274	-1318	-202	-1951	-2194	135
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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127	872	1563	2117	1323	-1975	-441	3414	-2574	301	-260	-2615	342	1058	-1309	178	-524	-1270	-158	-2194	208
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9958	-10958	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
128	-542	1060	461	-2291	-1975	-1567	-1354	484	-1501	126	-293	-343	-440	-2012	665	1904	-766	-523	918	-343
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-	-2	-9958	-10958	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
129	-1733	1544	-2117	-96	-124	-756	-1354	673	-864	1591	-2615	-2103	-845	-905	821	420	-279	-858	-2194	-239
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-	-2	-9958	-10958	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
130	-1733	1949	14	-2291	345	-1567	285	832	-1501	1679	-148	280	-1898	465	-1263	-1565	-1912	-648	1264	427
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-	-2	-9958	-10958	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
131	-1171	981	-434	-2291	-730	-1567	914	44	-558	-1461	-2615	2441	-1898	-135	763	-978	-1912	452	-2194	1980
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-	-25	-9958	-5933	-732	-1329	-1859	-465	*	*	*	*	*	*	*	*	*	*	*	*	*
132	-1715	1875	599	661	918	-673	602	-2556	1934	-815	-2598	-2085	-1880	-1994	-2256	-5	168	131	-2176	-45
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-	-54	-9935	-4804	-732	-1329	-1990	-419	*	*	*	*	*	*	*	*	*	*	*	*	*
133	1813	1696	-2059	-2233	-954	-1054	25	872	365	700	-2557	-2045	-977	-1954	-2216	573	-1854	-1142	-2136	-295
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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179	1043	1279	-28	-1809	1770	-211	-872	-467	-1019	650	-2134	-794	-1417	-1530	-1792	-1511	829	-115	-1712	130
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4	-9263	-10263	-732	-1329	-2532	-274	-274	*	*											
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3	-9360	-10360	-732	-1329	-3334	-151	-151	*	*											
181	1306	1209	-1701	-1875	1377	61	1085	457	-750	-1653	-2199	74	691	-762	-1858	-909	-1496	694	-1778	64
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3	-9360	-10360	-732	-1329	-3334	-151	-151	*	*											
182	557	-544	-95	-1875	-332	-1151	1085	677	-750	9	256	-1687	1031	266	-110	-141	173	543	-1778	-1620
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185	569	-544	-95	-1875	-1559	-55	2001	193	-177	516	-283	-199	1870	-1596	-1858	-1494	-1496	-79	-1778	-1620
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3	-9360	-10360	-732	-1329	-3334	-151	-151	*	*											
186	-1317	-544	704	-1875	-1559	782	1575	561	-1085	-344	708	316	1058	1554	-1259	299	-736	-93	-1778	-586

	206	979	-178	352	-36	372	585	635	436	-130	677	-164	41	73	-335	54	27	12	255	-97
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	73	335	54	27	12	255	-97
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	206	979	178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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189	-292	-544	52	822	-56	1074	1575	-2158	86	-181	-557	-189	1545	-1596	1163	-1577	-583	-1535	-1778	-1620
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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193	1256	-483	320	-1814	-1498	96	1637	595	-550	1082	-2139	980	-1422	-1535	770	290	-389	-335	-1717	-1559
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194	46	-483	566	-945	-1498	-671	1637	1247	-34	-723	-862	134	-335	-1535	608	326	-909	474	-1717	-1559
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195	147	-483	675	-1176	-1498	-1090	552	538	1083	-1011	-2139	128	824	-393	-347	589	-259	422	1717	1559
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	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	255	-97
	-4	9218	-10218	-732	-1329	-2912	-206	*	*											
197	791	-483	-1641	-1814	-1498	-31	-877	1114	423	37	393	-1626	819	-1535	-4	351	811	-1474	-1717	-1559
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199	228	-455	98	-835	-1470	-1062	-849	232	-88	373	-2111	-1599	699	578	-1632	16	1373	446	-1689	-1531
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200	819	-483	-1641	-1107	-1498	-285	1372	931	-1024	-272	831	292	-545	972	650	-1136	822	-1474	-1717	-1559
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	-4	9273	-10273	-732	-1329	-3450	-138	*	*											
201	1440	-483	-1641	-1702	-1498	-285	876	-960	612	1026	-2139	-1565	-545	-1535	698	-853	202	-345	-1717	-1559
	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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202	-561	-483	-1641	-1258	-1498	241	787	-1499	-1024	-501	831	990	-125	1368	1123	441	454	-150	-1717	-1559
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	-104	9273	-3873	-732	-1329	-3450	-138	*	*											
203	-1187	-414	-218	-693	973	-959	-808	-927	235	878	-2070	-956	-1353	-17	1638	859	-200	-1405	-1648	-1490
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11

DATE	Mon	Mar	8	11:48:32	1999																
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NULT	-4	-8455																			
NULE	595	-1558	85	338	-294	453	-1158	197	249	902	-1085	-142	-21	-313	45	531	201	384	-1998	-644	Y
HMM	A	C	D	E	F	G	H	I	K	L	M	N	P	Q	R	S	T	V	W		
	m->m	m->i	m->d	i->m	i->i	d->m	d->d	b->m	m->e												
1	-2134	*	-373	-1368	843	-982	-1403	-203	-358	-487	-1237	-480	-1005	144	-420	-1125	-856	1123	-645	1899	
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-	-35	-12645	-5393	-732	-1329	-1367	-708	-2134	*												
2	944	-868	175	-191	-1040	-693	-3985	16	-116	-402	40	-826	-1126	-424	-404	-1259	-295	1789	-1701	142	
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-	-74	-12898	-4334	-732	-1329	-1713	-525	*	*												
3	1031	-1833	760	-574	8	-1164	-1006	-93	84	-346	-5272	-1422	-936	-1159	898	-1387	237	589	-1714	1339	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-85	-12925	-4125	-732	-1329	-2368	-311	*	*												
4	1304	-402	1281	-232	-742	-573	-1045	-2587	-814	823	-1455	-328	-2448	-1750	-1443	-1309	137	-149	-775	1408	
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-	-39	-12900	-5250	-732	-1329	-2560	-268	*	*												
5	-661	-1289	802	-320	348	-1315	-510	-44	-76	734	-290	491	-316	-755	-520	-1086	-797	-589	-789	2126	
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97	
-	-45	-12917	-5019	-732	-1329	-3105	-178	*	*												
6	-182	-3597	1242	315	1420	-1246	-808	-819	-847	-501	-726	-581	-1886	-280	-515	-620	-940	-33	-1223	2430	
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-	-30	-12905	-5631	-732	-1329	-3779	-109	*	*												
7	-129	-1040	1817	3	-96	-155	494	-1600	-933	-748	-1640	-911	118	121	-502	-494	-347	-1471	-1677	2193	
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-	-27	-12892	-5789	-732	-1329	-2044	-401	*	*												
8	-448	742	765	1337	1077	-348	-2262	-1424	-469	-1082	-2593	-1518	-54	266							

169

10	566	-3641	865	237	-236	308	-403	-1219	-117	-362	-3101	-1972	723	207	561	190	-395	-927	209	97
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11	-140	-1857	1202	862	-1453	-224	245	-332	-496	-117	-897	526	-1402	299	-720	224	910	-1165	-439	-2026
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-85	-12941	-4138	-732	-1329	-3067	-183	*	*	*	*	*	*	*	*	*	*	*	*	*
12	-413	-3583	1081	1236	143	162	-1255	-248	305	-445	-1277	395	228	81	-236	-227	-404	-2094	963	-4659
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-175	-12890	-3129	-732	-1329	-3565	-127	*	*	*	*	*	*	*	*	*	*	*	*	*
13	-1441	-725	1690	780	-68	488	-1771	-59	-222	-1062	-381	-187	-101	48	-284	-69	-485	-626	1584	-1355
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-	-162	-12744	-3238	-732	-1329	-2321	-322	*	*	*	*	*	*	*	*	*	*	*	*	*
14	-2299	-29	1889	709	-547	91	-1308	-538	432	-227	-2413	736	-152	-1269	-823	-240	-140	-704	295	-677
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-92	-12691	-4027	-732	-1329	-3352	-149	*	*	*	*	*	*	*	*	*	*	*	*	*
15	-444	460	-178	1905	-1254	582	695	-505	553	-274	-5011	-670	-1375	-852	-162	-250	-1303	-502	322	-1160
-	202	974	-172	-344	-34	374	582	-629	436	-128	-674	-166	41	-76	-334	-57	24	-12	-249	-100
-	-7053	-189	-3116	-5	-8135	-2391	-305	*	*	*	*	*	*	*	*	*	*	*	*	*
16	-1570	-1581	682	1280	-919	-277	-1038	-302	-17	-4	-529	-830	1054	204	168	-608	-845	457	364	-1771
-	203	976	-174	-349	-35	369	583	-631	441	-127	-674	-166	37	-71	-334	-55	25	-11	-256	-101
-	-6940	-144	-3526	-5	-8326	-1744	-511	*	*	*	*	*	*	*	*	*	*	*	*	*
17	-1388	-1755	1474	30	-445	540	-569	-637	-111	770	-458	-294	-2339	465	-1226	70	114	-388	341	-1275
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-	-16	-12791	-6501	-732	-1329	-2694	-242	*	*	*	*	*	*	*	*	*	*	*	*	*
18	-1284	-168	812	309	799	395	-660	-228	93	997	61	-1032	-672	-842	-1212	-24	-828	-478	1150	-1977
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-12850	-7086	-732	-1329	-1571	-592	*	*	*	*	*	*	*	*	*	*	*	*	*
19	-2782	-2336	-942	-242	435	50	-487	198	395	1500	-1367	-425	-3233	-598	-839	719	-453	-298	1064	-1560
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-	-16	-12980	-6485	-732	-1329	-1880	-457	*	*	*	*	*	*	*	*	*	*	*	*	*
20	-715	156	-358	518	1322	-222	224	-1232	687	2	-850	68	-883	-513	363	187	236	-558	1029	-4787
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-	-24	-13023	-5937	-732	-1329	-1194	-829	*	*	*	*	*	*	*	*	*	*	*	*	*
21	-1964	-1241	45	385	1707	394	422	39	956	293	-452	-4	-1840	-540	-13	-1063	-300	-1262	285	-1002
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-	-9	-13093	-7334	-732	-1329	-1982	-421	*	*	*	*	*	*	*	*	*	*	*	*	*
22	-741	-1256	681	701	-1256	551	301	-169	1541	-1443	367	198	-2671	261	240	-464	-1044	-556	1095	-2407
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-36	-13114	-5367	-732	-1329	-2132	-374	*	*	*	*	*	*	*	*	*	*	*	*	*
23	-1599	-2013	212	684	-34	1160	-166	192	1083	-906	-1324	-112	-419	-331	23	-816	-432	-640	1520	-687
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-18	-13101	-6348	-732	-1329	-1648	-555	*	*	*	*	*	*	*	*	*	*	*	*	*
24	-2667	-771	699	1276	-1328	1543	-801	-310	823	-430	-1065	470	-3375	-474	-838	-1483	-1196	-437	1815	-1704
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-	-13	-13121	-6785	-732	-1329	-2843	-216	*	*	-476	-1131	-1328	-1275	312	128	-1592	-282	-784	1707	-273
25	-978	-7	1784	712	-200	91	-430	-700	739	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-31	-13117	-5562	-732	-1329	-2575	-265	*	*	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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HMMER2.0

NAME Tndm.txt

DESC

LENG 40

ALPH Amino

RF no

CS no

COM [converted from an old Plan9 HMM]

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DATE Mon Mar 8 11:48:46 1999

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NULE

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17	-1701	-928	-2085	1353	-478	1550	-1322	-2542	-1469	-2037	-2583	33	937	-1980	-2242	1869	-1692	-1919	-2162	70
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
18	-71	350	-2085	1975	-1943	1780	-1322	-2542	-1469	-2037	-2583	-2071	-819	-1980	17	1240	-1880	-909	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
19	698	-928	-2085	1988	-1943	-209	-1322	-2542	-1469	-2037	-2583	-2071	101	-1980	389	1755	-1880	-1509	-2162	392
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
20	136	-928	1239	1707	-1943	1529	-1322	-2542	-1469	-2037	-2583	-2071	-1866	-109	-2242	803	380	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
21	-1596	-928	-979	-2259	-1943	1120	-1322	-2542	-1469	-2037	-2583	1679	1715	186	-2242	1706	-68	-1919	-2162	-329
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
22	-1360	-928	-2085	1353	164	1658	-1322	-2542	-1469	-2037	-2583	-2071	561	-1980	-2242	1974	-433	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-46	-9917	-5050	-732	-1329	-76	-4293	*	*	*	*	*	*	*	*	*	*	*	*	*
23	-451	883	-1795	2007	-1909	1510	-1288	-2508	-1435	-2003	-2550	-2037	-634	-1946	230	1275	-133	-1885	-2128	-1970
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9873	-10873	-732	-1329	-690	-1395	*	*	*	*	*	*	*	*	*	*	*	*	*
24	940	-894	668	1629	-1909	-1501	-1288	-2508	-1435	584	-2550	-2037	-479	-1946	422	1235	-1847	-1512	-2128	-1970
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-2	-9873	-10873	-732	-1329	-49	-4908	*	-1469	-2037	-2583	1228	-1866	-1980	-2242	1188	380	-1919	-2162	-2004
25	-1701	-928	1120	1624	-1943	1328	-1322	-2542	-1469	-2037	-2583	1228	-1866	-1980	-2242	1188	380	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	-2037	-2583	1837	-1866	-1980	-2242	1712	-68	-1919	-2162	-2004
26	865	-928	-822	-2259	-1943	1663	-1322	-2542	-1469	-2037	-2583	1837	-1866	-1980	-2242	1712	-68	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	-2037	-2583	1837	-1866	-1980	-2242	1712	-68	-1919	-2162	-2004
27	-751	-928	-2085	1353	-1105	1748	-1322	-2542	-1469	-2037	-2583	1837	-1866	-1980	-2242	2055	-1718	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	-2037	-2583	1837	-1866	-1980	-2242	2055	-1718	-1919	-2162	-2004
28	113	1312	-2085	1975	-1943	1313	-1322	-2542	-1469	-2037	-2583	1837	-1866	-1980	-2242	2055	-1718	-1919	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9917	-10917	-732	-1329	-76	-4293	*	*	-2037	-2583	1837	-1866	-1980	-2242	2055	-1718	-1919	-2162	-2004
29	929	-928	-2085	2431	-1943	-1535	-1322	-2542	-1469	-2037	-2583	1837	-1866	-1980	-2242	1628	-1880	-1510	-2162	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-233	-9917	-2753	-732	-1329	-76	-4293	*	*	-2037	-2583	1837	-1866	-1980	-2242	1628	-1880	-1510	-2162	-2004
30	-174	-733	1842	1729	-1748	-44	-1127	-2348	-1275	-1843	-2389	862	-1672	-1328	-2047	782	570	-1725	-1967	-1809
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-158	-9600	-3284	-732	-1329	-1766	-502	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
31	397	-620	-1777	462	-1635	653	-1014	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9451	-10451	-732	-1329	-2338	-318	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
32	-1393	-620	-1777	-98	-1121	1847	-1014	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9451	-10451	-732	-1329	-2338	-318	-2234	-1161	-1729	-2275	2294	-1558	-1672	-1934	1871	-1572	-1611	-1854	-1696
33	-467	786	-1666	1335	-1690	1757	-1069	-2289	-1216	-1784	-2331	-1818	267	-1727	520	1222	-1627	-175	-1909	-1751
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-144	-9525	-3418	-732	-1329	-2100	-383	-2289	-1216	-1784	-2331	-1818	267	-1727	520	1222	-1627	-175	-1909	-1751
34	598	-572	-1577	1953	-1587	-1179	-966	-2186	-1113	-1681	-2228	-1715	1051	-1624	745	1481	-1525	-1055	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	-2186	-1113	-1681	-2228	-1715	1051	-1624	745	1481	-1525	-1055	-1806	-1648
35	525	-572	993	1886	-1587	864	-966	-2186	-1113	-1681	-2228	391	-1511	-1624	-1886	1026	-1342	-1563	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	-2186	-1113	-1681	-2228	391	-1511	-1624	-1886	1026	-1342	-1563	-1806	-1648
36	-1345	-572	-1730	-1690	-1587	680	-251	-2186	-1113	-1681	-2228	391	-1511	-1624	-1886	1026	-1342	-1563	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-3	-9385	-10385	-732	-1329	-2453	-291	-2186	-1113	-1681	-2228	391	-1511	-1624	-1886	1026	-1342	-1563	-1806	-1648
37	-1021	-572	-1730	-46	790	1956	-966	-2186	-1113	-1681	-2228	-1715	150	-1624	-221	1843	-860	-1563	-1806	-1648
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-208	-9385	-2915	-732	-1329	-2453	-291	-2186	-1113	-1681	-2228	-1715	150	-1624	-221	1843	-860	-1563	-1806	-1648
38	-88	-429	-1587	790	-1444	1696	-823	-2044	-971	-1539	-2085	-1573	371	-1481	803	1218	-1382	86	-1663	-1505
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-398	-9185	-2063	-732	-1329	-2901	-207	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
39	908	-160	-1318	1747	-1175	-767	-554	-1775	-701	-1269	-1816	-1303	824	967	545	517	-1113	-1151	-1394	-1236

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-740	-8654	-1327	-732	-1329	-3324	-152	*	*	*	*	*	*	*	*	*	*	*	*	*
40	-530	243	-914	2549	-772	-364	-151	-1371	-298	-866	-1413	-900	-695	1035	-1071	-790	-709	-748	-991	-833
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*

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10	191	964	-194	-367	-51	357	570	-651	423	-146	94	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
11	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	743	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
12	191	964	-194	-86	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
13	191	964	-194	-367	-51	357	570	-284	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
14	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	193	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
15	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	253	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
16	191	964	-194	-367	-51	357	570	-651	423	25	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
17	191	964	-194	-86	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
18	191	1364	-194	-367	-51	357	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
19	191	964	-194	-367	-51	357	570	-651	423	-146	-692	-180	301	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
20	191	964	-88	-367	-51	468	570	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-41	-5731	-6731	-732	-1329	-1256	-782	*	*	*	*	*	*	*	*	*	*	*	*	*
21	191	964	-194	-367	-51	357	968	-651	423	-146	-692	-180	25	-88	-350	-69	11	-27	-270	-112
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*

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wdef(pkc,protein, 'protein kinase C').
wdef(position, site, site).
wdef(positions,site, site).
wdef(protease,protein,protease).
wdef(ps1,protein,'presenilin 1').
wdef(ps2,protein,'presenilin 2').
wdef(rap1, protein, 'Rap1').
wdef(ras, protein, 'Ras').
wdef(receptors, substance, receptor).
wdef(rela, protein, 'RelA').
wdef(residues,substance,residue).
wdef(responsive, state, active).
wdef(s6, protein, 'S6').
wdef(selectively, constraint, selective).
wdef(ser112, site, 'Ser112').
wdef(ser136, site, 'Ser136').
wdef(ser32, smallmolecule, 'Ser32').
phrase(ps1, protein
wdef(ser36, smallmolecule, 'Ser36').
phrase(ps1, protein, [ps1,'-',ctf], 'ps1-ctf',r).
wdef(sh2,domain, 'SH2').
wdef(sh3,domain,'SH3').
wdef(shc, protein, 'Shc').
wdef(signalsome, complex,signalsome).
wdef(sites, site,site).
wdef(sos, protein, 'Sos').
wdef(staurosporine,smallmolecule,staurosporine).
wdef(sts,smallmolecule,'STS').
wdef(tcr, complex, 'T-cell receptor').
wdef(tetracycline, smallmolecule,tetracycline).
wdef(thr229,aminoacid, 'Thr229').
wdef(thr308,aminoacid,'Thr308').
wdef(thr389, aminoacid, 'Thr389').
wdef(threonine,aminoacid,threonine).
wdef(tyrosine, aminoacid, tyrosine).
wdef(unresponsive, state,inactive).
wdef(unstimulated, state, inactive).
wdef(zvad,smallmolecule,'zVAD').
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% lexsyn.pat
% revised March 17, 2000
%
%           SYNTACTIC LEXICON FOR ACTIONS
% Contains syntactic entries for action type words and phrases
%
% synp(+Word1,+Wordlist,+Syn)
% synp: Word1 is first word of phrase, Wordlist is list of words i
n phrase
% synp: Syn is syntactic category
%
% synw(+Word,+Syn) is same as synp except there is no wordlist
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

synp(account,[account,for],v).
synp(account,[account,for],vp).
synp(accounted,[accounted,for],ved).
synp(accounted,[accounted,for],ven).
synp(accounting,[accounting,for],ving).
synp(accounting,[accounting,for],n).
synp(accounts,[accounts,for],vp).
synp(add,[add,up],vp).
synp(add,[add,up],v).
synp(added,[added,up],ved).
synp(added,[added,up],ven).
synp(adding,[adding,up],n).
synp(adding,[adding,up],ving).
synp(adds,[adds,up],vp).
synp(am,[am,a,means,of,producing],vp).
synp(am,[am,due,to],vp).
synp(are,[are,a,means,of,producing],vp).
synp(are,[are,due,to],vp).
synp(as,[as,a,result,of],prep).
synp(attributable,[attributable,to],vp). % ?
synp(attributed,[attributed,to],ven).
synp(based,[based,on],ven).
synp(based,[based,upon],ven).
synp(be,[be,a,means,of,producing],v).
synp(be,[be,due,to],v).
synp(because,[because,of],prep).
synp(been,[been,a,means,of,producing],ven).
synp(been,[been,due,to],ven).
synp(being,[being,a,means,of,producing],n).
synp(being,[being,a,means,of,producing],ving).

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synp(being, [being,due,to],n).
synp(being, [being,due,to],ving).
synp(caused, [caused,by],ved).
synp(caused, [caused,by],ven).
synp(convey, [convey,a, signal],v).
synp(convey, [convey,a, signal],vp).
synp(conveyed, [conveyed,a, signal],ved).
synp(conveyed, [conveyed,a, signal],ven).
synp(conveying, [conveying, a, signal],ving).
synp(conveying, [conveying,a, signal],n).
synp(conveys, [conveys,a, signal],vp).
synp(dissociate, [dissociate, from],vp).
synp(dissociate, [dissociate,from],v).
synp(dissociated, [dissociated,from],ved).
synp(dissociated, [dissociated,from],ven).
synp(dissociates, [dissociates, from],vp).
synp(dissociating, [dissociating,from],n).
synp(dissociating, [dissociating,from],ving).
synp(dissociation, [dissociation, from],n).
synp(down, [down, '-',regulate],v).
synp(down, [down, '-',regulate],vp).    % A down-regulates B      A
    --> B
synp(down, [down, '-',regulated],ved).
synp(down, [down, '-',regulated],ven).
synp(down, [down, '-',regulates],vp).
synp(down, [down, '-',regulating],n).
synp(down, [down, '-',regulating],ving).
synp(down, [down, '-',regulation],n).
synp(due, [due,to,the,fact,that],adj).
synp(due, [due,to],adj).    % ?
synp(form, [form, complex],v).
synp(form, [form, complex],vp).
synp(formation, [formation, of, complex],n).
synp(formed, [formed, complex],ved).
synp(formed, [formed, complex],ven).
synp(forming, [forming, complex],n).
synp(forming, [forming, complex],ving).
synp(forms, [forms, complex],vp).
synp(had, [had,an,active,role,in],ved).
synp(had, [had,an,active,role,in],ven).
synp(has, [has,an,active,role,in],vp).
synp(have, [have,an,active,role,in],v).
synp(have, [have,an,active,role,in],vp).

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synp(having, [having,an,active,role,in],n).
synp(having, [having,an,active,role,in],ving).
synp(is, [is,a,means,of, producing],vp).
synp(is, [is,due,to],vp).
synp(functions,[functions,as,a,negative,regulator,of],vp).
synp(function,[function,as,a,negative,regulator,of],vp).
synp(lead, [lead,to],v).
synp(leads, [leads,to],vp).
synp(leading, [leading,to],n).
synp(leading, [leading,to],ving).
synp(leads, [leads,to],vp).
synp(led,[led,to],ved).
synp(led,[led,to],ven).
synp(may,[may,be,responsible,for],vp).
synp(mediate,[mediate, a, signal], v).      %A mediates a signal to
B
synp(mediate,[mediate, a, signal], vp).
synp(mediated,[mediated, a, signal], ved).
synp(mediated,[mediated, a, signal], ven).
synp(mediates,[mediates, a, signal], vp).
synp(mediating,[mediating, a, signal],n).
synp(mediating,[mediating, a, signal], ving).
synp(mediation,[mediation,of, a, signal],n).
synp(n,[n,'-',acetylate],v).
synp(n,[n,'-',acetylate],vp).
synp(n,[n,'-',acetylated],ved).
synp(n,[n,'-',acetylated],ven).
synp(n,[n,'-',acetylates],vp).
synp(n,[n,'-',acetylating],n).
synp(n,[n,'-',acetylating],ving).
synp(n,[n,'-',acetylation],n).
synp(n,[n,'-',acylate],v).
synp(n,[n,'-',acylate],vp).
synp(n,[n,'-',acylated],ved).
synp(n,[n,'-',acylated],ven).
synp(n,[n,'-',acylates],vp).
synp(n,[n,'-',acylating],n).
synp(n,[n,'-',acylating],ving).
synp(n,[n,'-',acylation],n).
synp(n,[n,'-',glycosylate],v).
synp(n,[n,'-',glycosylate],vp).
synp(n,[n,'-',glycosylated],ved).
synp(n,[n,'-',glycosylated],ven).

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synp(n, [n, '-', glycosylates], vp) .
synp(n, [n, '-', glycosylating], n) .
synp(n, [n, '-', glycosylating], ving) .
synp(n, [n, '-', glycosylation], n) .
synp(n, [n, '-', terminal, proteolysis], n) .
synp(o, [o, '-', glycosylate], v) .
synp(o, [o, '-', glycosylate], vp) .
synp(o, [o, '-', glycosylated], ved) .
synp(o, [o, '-', glycosylated], ven) .
synp(o, [o, '-', glycosylates], vp) .
synp(o, [o, '-', glycosylating], n) .
synp(o, [o, '-', glycosylating], ving) .
synp(o, [o, '-', glycosylation], n) .
synp(only, [only, after], prep) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylate], v) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylate], vp) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylated], ved) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylated], ven) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylates], vp) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylating], n) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylating], ving) .
synp(prolyl, [prolyl, '-', 4, '-', hydroxylation], n) .
synp(result, [result, from], v) .
synp(result, [result, from], vp) .
synp(result, [result, in], v) .
synp(result, [result, in], vp) .
synp(resulted, [resulted, from], ved) .
synp(resulted, [resulted, from], ven) .
synp(resulted, [resulted, in], ved) .
synp(resulted, [resulted, in], ven) .
synp(resulting, [resulting, from], n) .
synp(resulting, [resulting, from], ving) .
synp(resulting, [resulting, in], n) .
synp(resulting, [resulting, in], ving) .
synp(results, [results, from], vp) .
synp(results, [results, in], vp) .
synp(set, [set, free], v) .
synp(set, [set, free], vp) .
synp(set, [set, free], ved) .
synp(set, [set, free], ved) .
synp(set, [set, free], ven) .
synp(set, [set, free], ven) .
synp(set, [set, free], vp) .

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synp(set, [set, free],vp).
synp(sets, [sets, free],vp).
synp(sets, [sets, free],vp).
synp(setting, [setting, free],n).
synp(setting, [setting, free],n).
synp(setting, [setting, free],ving).
synp(setting, [setting, free],ving).
synp(suppress, [suppress, activity, of],v).
synp(suppress, [suppress, activity, of],vp).
synp(suppressed, [suppressed, activity, of],ved).
synp(suppressed, [suppressed, activity, of],ven).
synp(suppresses, [suppresses, activity, of],vp).
synp(suppressing, [suppressing, activity, of],n).
synp(suppressing, [suppressing, activity, of],ving).
synp(suppression, [suppression,of, activity, of],n).
synp(switch, [switch, on, the, activity, of],vp).
synp(switched, [switched, on, the, activity, of],ved).
synp(switched, [switched, on, the, activity, of],ved).
synp(switched, [switched, on, the, activity, of],ved).
synp(switched, [switched, on, the, activity, of],ved).
synp(switched, [switched, on, the, activity, of],ved).
synp(switches, [switches, on, the, activity, of],vp).
synp(up, [up, '-',regulate],v). % A up-regulates B B --> A
synp(up, [up, '-',regulate],vp). % A up-regulates B B --> A
synp(up, [up, '-',regulated], ved).
synp(up, [up, '-',regulated],ven). % A up-regulates B B --> A
synp(up, [up, '-',regulates], vp).
synp(up, [up, '-',regulating],n). % A up-regulates B B --> A
synp(up, [up, '-',regulating],ving). % A up-regulates B B --> A
synp(up, [up, '-',regulation],n).
synp(was, [was,a,means,of, producing],ved).
synp(was, [was,due,to],ved).
synp(were, [were,a,means,of, producing],ved). % ?
synp(were, [were,due,to],ved).
synw(acetylate,v).
synw(acetylate,vp).
synw(acetylated,ved).
synw(acetylated,ven).
synw(acetylates,vp).
synw(acetylating,n).
synw(acetylating,ving).
synw(acetylation,n).
synw(activate,v).

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synw(activate, vp) .
synw(activated, ved) .
synw(activated, ven) .
synw(activates, vp) .
synw(activating, n) .
synw(activating, ving) .
synw(activation, n) .
synw(add, v) .
synw(add, vp) .
synw(added, ved) .
synw(added, ven) .
synw(adding, n) .
synw(adding, ving) .
synw(addition, n) .
synw(adds, vp) .
synw(after, prep) .
synw(aggregate , v) .
synw(aggregate , vp) .
synw(aggregated , ved) .
synw(aggregated , ven) .
synw(aggregates, vp) .
synw(aggregating , n) .
synw(aggregating , ving) .
synw(aggregation , n) .
synw(arrest, n) .
synw(arrest, v) .
synw(arrest, vp) .
synw(arrested, ved) .
synw(arrested, ven) .
synw(arresting, n) .
synw(arresting, ving) .
synw(arrests, vp) .
synw(associate, v) .
synw(associate, vp) .
synw(associated, ved) .
synw(associated, ven) .
synw(associates, vp) .
synw(associating, n) .
synw(associating, ving) .
synw(association, n) .
synw(attach , v) .
synw(attach, vp) .
synw(attached , ved) .

synw(attached ,ven) .
synw(attaches, vp) .
synw(attachng ,n) .
synw(attachng ,ving) .
synw(attachment,n) .
synw(bind,v) .
synw(bind, vp) .
synw(binding,n) .
synw(binding,ving) .
synw(binds, vp) .
synw(block,v) .
synw(block, vp) .
synw(blockage,n) .
synw(blocked, ved) .
synw(blocked, ven) .
synw(blocking,n) .
synw(blocking,ving) .
synw(blocks, vp) .
synw(bound, ved) .
synw(bound, ven) .
synw(break,v) .
synw(break, vp) .
synw(breakage, n) .
synw(breaking,n) .
synw(breaking,ving) .
synw(breaks, vp) .
synw(broke, ved) .
synw(broken, ven) .
synw(catalyzation,n) .
synw(catalyze,v) .
synw(catalyze, vp) .
synw(catalyzed, ved) .
synw(catalyzed, ven) .
synw(catalyzes, vp) .
synw(catalyzing,n) .
synw(catalyzing,ving) .
synw(causation,n) .
synw(cause,n) .
synw(cause,v) .
synw(cause, ven) .
synw(cause, vp) .
synw(caused, ved) .
synw(causes, vp) .

synw(causing, n) .
synw(causing, ving) .
synw(cleavage, n) .
synw(cleave, v) .
synw(cleave, vp) .
synw(cleaved, ved) .
synw(cleaved, ven) .
synw(cleaves, vp) .
synw(cleaving, n) .
synw(cleaving, ving) .
synw(coimmunoprecipitate, v) .
synw(coimmunoprecipitate, vp) .
synw(coimmunoprecipitated, ved) .
synw(coimmunoprecipitated, ven) .
synw(coimmunoprecipitates, vp) .
synw(coimmunoprecipitating, n) .
synw(coimmunoprecipitating, ving) .
synw(coimmunoprecipitation, n) .
synw(combination, n) .
synw(combine, v) .
synw(combine, vp) .
synw(combined, ved) .
synw(combined, ven) .
synw(combines, vp) .
synw(combining, n) .
synw(combining, ving) .
synw(conjugate, v) .
synw(conjugate, vp) .
synw(conjugated, ve) .
synw(conjugated, ved) .
synw(conjugates, vp) .
synw(conjugating, n) .
synw(conjugating, ving) .
synw(conjugation, n) .
synw(connect, vp) .
synw(connect, v) .
synw(connected, ve) .
synw(connected, ved) .
synw(connecting, n) .
synw(connecting, ving) .
synw(connection, n) .
synw(connects, vp) .
synw(constrain, v) .

synw(constrain, vp) .
synw(constrained, ved) .
synw(constrained, ven) .
synw(constraining, n) .
synw(constraining, ving) .
synw(constrains, vp) .
synw(constraint, n) .
synw(coprecipitate, v) .
synw(coprecipitate, vp) .
synw(coprecipitated, ved) .
synw(coprecipitated, ven) .
synw(coprecipitates, vp) .
synw(coprecipitating, n) .
synw(coprecipitating, ving) .
synw(coprecipitation, n) .
synw(copurification, n) .
synw(copurified, ved) .
synw(copurified, ven) .
synw(copurifies, vp) .
synw(copurify, vp) .
synw(copurify, v) .
synw(copurifying, n) .
synw(copurifying, ving) .
synw(couple, vp) .
synw(couple, v) .
synw(coupled, ved) .
synw(coupled, ven) .
synw(couples, vp) .
synw(coupling, n) .
synw(coupling, ving) .
synw(cut, n) .
synw(cut, v) .
synw(cut, ved) .
synw(cut, ven) .
synw(cut, vp) .
synw(cuts, vp) .
synw(cutting, n) .
synw(cutting, ving) .
synw(deactivate, v) .
synw(deactivate, vp) .
synw(deactivated, ved) .
synw(deactivated, ven) .
synw(deactivates, vp) .

synw(deactivating,n) .
synw(deactivating,ving) .
synw(deactivation,n) .
synw(death,n) .
synw(demethylate,v) .
synw(demethylate,vp) .
synw(demethylated,ved) .
synw(demethylated,ven) .
synw(demethylates, vp) .
synw(demethylating,n) .
synw(demethylating,ving) .
synw(demethylation, n) .
synw(dephosphorylate, v) .
synw(dephosphorylate, vp) .
synw(dephosphorylated, ved) .
synw(dephosphorylated, ven) .
synw(dephosphorylates, vp) .
synw(dephosphorylating, n) .
synw(dephosphorylating, ving) .
synw(dephosphorylation, n) .
synw(die,v) .
synw(die,vp) .
synw(died,ved) .
synw(died,ven) .
synw(dies,vp) .
synw(disassemble, v) .
synw(disassemble, vp) .
synw(disassembled, ved) .
synw(disassembled, ven) .
synw(disassembles, vp) .
synw(disassembling, n) .
synw(disassembling, ving) .
synw(disassembly, n) .
synw(discharge,n) .
synw(discharge,v) .
synw(discharge,vp) .
synw(discharged,ved) .
synw(discharged,ven) .
synw(discharges,vp) .
synw(discharging,n) .
synw(discharging,ving) .
synw(disengage,v) .
synw(disengage,vp) .

synw(disengaged,ved) .
synw(disengaged,ven) .
synw(disengagement,n) .
synw(disengages,vp) .
synw(disengaging,n) .
synw(disengaging,ving) .
synw(divide,v) .
synw(divide,vp) .
synw(divided,ved) .
synw(divided,ven) .
synw(divides,vp) .
synw(dividing,n) .
synw(dividing,ving) .
synw(division,n) .
synw(dying,n) .
synw(dying,ving) .
synw(enhance,v) .
synw(enhance,vp) .
synw(enhanced,ved) .
synw(enhanced,ven) .
synw(enhancement,n) .
synw(enhances,vp) .
synw(enhancing,n) .
synw(enhancing,ving) .
synw(express,v) .
synw(express,vp) .
synw(expressed,ved) .
synw(expressed,ved) .
synw(expressed,ven) .
synw(expresses,vp) .
synw(expressing,n) .
synw(expressing,n) .
synw(expressing,ving) .
synw(expression,n) .
synw(generate,v) .
synw(generate,vp) .
synw(generated,ved) .
synw(generated,ven) .
synw(generates,vp) .
synw(generating,n) .
synw(generating,ving) .
synw(generation,n) .
synw(hew,v) .

synw(hew, vp) .
synw(hewed, ved) .
synw(hewed, ven) .
synw(hewing, n) .
synw(hewing, ving) .
synw(hews, vp) .
synw(hinder, v) .
synw(hinder, vp) .
synw(hindered, ved) .
synw(hindered, ven) .
synw(hindering, n) .
synw(hindering, ving) .
synw(hinders, vp) .
synw(hindrance, n) .
synw(inactivate, v) .
synw(inactivate, vp) .
synw(inactivated, ved) .
synw(inactivated, ven) .
synw(inactivates, vp) .
synw(inactivating, n) .
synw(inactivating, ving) .
synw(inactivation, n) .
synw(incite, v) .
synw(incite, vp) .
synw(incited, ved) .
synw(incited, ven) .
synw(incitement, n) .
synw(incites, vp) .
synw(inciting, n) .
synw(inciting, ving) .
synw(induce, v) .
synw(induce, vp) .
synw(induced, ved) .
synw(induced, ven) .
synw(induces, vp) .
synw(inducing, n) .
synw(inducing, ving) .
synw(induction, n) .
synw(influence, n) .
synw(influence, v) .
synw(influence, vp) .
synw(influenced, ved) .
synw(influenced, ven) .

synw(influences, vp)..
synw(influencing, n)..
synw(influencing, ving) . % ?
synw(inhibit, v)..
synw(inhibit, vp)..
synw(inhibited, ved)..
synw(inhibited, ven)..
synw(inhibiting, n)..
synw(inhibiting, ving)..
synw(inhibition, n)..
synw(inhibits, vp)..
synw(initiate, v)..
synw(initiate, vp)..
synw(initiated, ved)..
synw(initiated, ven)..
synw(initiates, vp)..
synw(initiating, n)..
synw(initiating, ving)..
synw(initiation, vp)..
synw(instigate, v)..
synw(instigate, vp)..
synw(instigated, ved)..
synw(instigated, ven)..
synw(instigates, vp)..
synw(instigating, n)..
synw(instigating, ving)..
synw(instigation, n)..
synw(interact, v)..
synw(interact, vp)..
synw(interacted, ved)..
synw(interacted, ven)..
synw(interacting, n)..
synw(interacting, ving)..
synw(interaction, n)..
synw(interactions, n)..
synw(interacts, vp)..
synw(join ,vp)..
synw(join, v)..
synw(joined, ved)..
synw(joined, ven)..
synw(joining, n)..
synw(joining, ving)..
synw(joins, vp)..

synw(juncture,n) .
synw(liberate,v) .
synw(liberate,vp) .
synw(liberated,ved) .
synw(liberated,ven) .
synw(liberates,vp) .
synw(liberating,n) .
synw(liberating,ving) .
synw(liberation,n) .
synw(limit,v) .
synw(limit,vp) .
synw(limitation, n) .
synw(limited,ved) .
synw(limited,ven) .
synw(limiting,n) .
synw(limiting,ving) .
synw(limits,vp) .
synw(link,n) .
synw(link,v) .
synw(link,vp) .
synw(linked,ved) .
synw(linked,ven) .
synw(linking,n) .
synw(linking,ving) .
synw(links, vp) .
synw mediate,v) .
synw(mediate,vp) .
synw(mediated,ved) .
synw(mediated,ven) .
synw(mediates,vp) .
synw(mediating,n) .
synw(mediating,ving) .
synw(mediation,n) .
synw(methylate, vp) .
synw(methylate,v) .
synw(methylated,ved) .
synw(methylated,ven) .
synw(methylates, vp) .
synw(methylating,n) .
synw(methylating,ving) .
synw(methylation, n) .
synw(modification,n) .
synw(modified,ved) .

synw(modified, ven) .
synw(modifies, vp) .
synw(modify, v) .
synw(modify, vp) .
synw(modifying, n) .
synw(modifying, ving) .
synw(mutate, v) .
synw(mutate, vp) .
synw(mutated, ved) .
synw(mutated, ven) .
synw(mutates, vp) .
synw(mutating, n) .
synw(mutating, ving) .
synw(mutation, n) .
synw(overexpress, v) .
synw(overexpress, vp) .
synw(overexpressed, ved) .
synw(overexpressed, ven) .
synw(overexpresses, vp) .
synw(overexpressing, n) .
synw(overexpressing, ving) .
synw(overexpression, n) .
synw(pair, v) .
synw(pair, vp) .
synw(paired, ved) .
synw(paired, ven) .
synw(pairing, n) .
synw(pairing, ving) .
synw(pairs, vp) .
synw(phosphorylate, n) .
synw(phosphorylate, vp) .
synw(phosphorylated, ved) .
synw(phosphorylated, ven) .
synw(phosphorylates, vp) .
synw(phosphorylating, n) .
synw(phosphorylating, ving) .
synw(phosphorylation, n) .
synw(promote, v) .
synw(promote, vp) .
synw(promoted, ved) .
synw(promoted, ven) .
synw(promotes, vp) .
synw(promoting, n) .

synw(promoting,ving) .
synw(promotion,n) .
synw(prompt,n) .
synw(prompt,v) .
synw(prompt,vp) .
synw(prompted,ved) .
synw(prompted,ven) .
synw(prompting,n) .
synw(prompting,ving) .
synw(prompts,vp) .
synw(react,v) .
synw(react,vp) .
synw(reacted,ved) .
synw(reacted,ven) .
synw(reacting,n) .
synw(reacting,ving) .
synw(reaction,n) .
synw(reacts,vp) .
synw(regulate,v) .
synw(regulate,vp) .
synw(regulated,ved) .
synw(regulated,ven) .
synw(regulates,vp) .
synw(regulating,n) .
synw(regulating,ving) .
synw(regulation,n) .
synw(release,n) .
synw(release,v) .
synw(release,vp) .
synw(released,ved) .
synw(released,ven) .
synw(releases,vp) .
synw(releasing,n) .
synw(releasing,ving) .
synw(removal,n) .
synw(remove,v) .
synw(remove,vp) .
synw(removed,ved) .
synw(removed,ven) .
synw(removes,vp) .
synw(removing,n) .
synw(removing,ving) .
synw(replace,v) .

synw(replace, vp) .
synw(replaced, ved) .
synw(replaced, ven) .
synw(replacement, n) .
synw(replaces, vp) .
synw(replacing, n) .
synw(replacing, ving) .
synw(repress, vp) .
synw(repress, v) .
synw(repressed, ved) .
synw(repressed, ven) .
synw(represses, vp) .
synw(repressing, n) .
synw(repressing, ving) .
synw(repression, n) .
synw(require, v) .
synw(require, vp) .
synw(required, ved) .
synw(required, ven) .
synw(requirement, n) .
synw(requires, vp) .
synw(requiring, n) .
synw(requiring, ving) .
synw(restrain, vp) .
synw(restrain, v) .
synw(restrained, ved) .
synw(restrained, ven) .
synw(restraining, n) .
synw(restraining, ving) .
synw(restrains, vp) .
synw(restraint, n) .
synw(sensitization, n) .
synw(sensitize, vp) .
synw(sensitize, v) .
synw(sensitized, ved) .
synw(sensitized, ven) .
synw(sensitizes, vp) .
synw(sensitizing, n) .
synw(sensitizing, ving) .
synw(separate, v) .
synw(separate, vp) .
synw(separated, ved) .
synw(separated, ven) .

synw(separates, vp) .
synw(separating, n) .
synw(separating, ving) .
synw(separation, n) .
synw(sever, v) .
synw(sever, vp) .
synw(severance, n) .
synw(severed, ved) .
synw(severed, ven) .
synw(severing, n) .
synw(severing, ving) .
synw(severs, vp) .
synw(signal, v) .
synw(signal, vp) .
synw(signaled, ved) .
synw(signaled, ved) .
synw(signaled, ven) .
synw(signaling, n) .
synw(signaling, ving) .
synw(signals, vp) .
synw(split, n) .
synw(split, v) .
synw(split, ved) .
synw(split, ven) .
synw(split, vp) .
synw(splits, vp) .
synw(splitting, n) .
synw(splitting, ving) .
synw(stimulate, v) .
synw(stimulate, vp) .
synw(stimulated, ved) .
synw(stimulated, ven) .
synw(stimulates, vp) .
synw(stimulating, n) .
synw(stimulating, ving) .
synw(stimulation, n) .
synw(substitute, v) .
synw(substitute, vp) .
synw(substituted, ved) .
synw(substituted, ven) .
synw(substitutes, vp) .
synw(substituting, n) .
synw(substituting, ving) .

synw(substitution,n) .
synw(suppress, vp) .
synw(suppress,v) .
synw(suppressed,ved) .
synw(suppressed,ven) .
synw(suppresses, vp) .
synw(suppressing,n) .
synw(suppressing,ving) .
synw(suppression,n) .
synw(tie,n) .
synw(tie,v) .
synw(tie,vp) .
synw(tied,ved) .
synw(tied,ven) .
synw(ties,vp) .
synw(transcribe,v) .
synw(transcribe,vp) .
synw(transcribed,ved) .
synw(transcribed,ven) .
synw(transcribes,vp) .
synw(transcribing,n) .
synw(transcribing,ving) .
synw(transcription,n) .
synw(tying,n) .
synw(tying,ving) .
synw(ubiquitization,n) .
synw(ubiquitize,v) .
synw(ubiquitize,vp) .
synw(ubiquitized,ved) .
synw(ubiquitized,ven) .
synw(ubiquitinizes,vp) .
synw(ubiquitizing,n) .
synw(ubiquitizing,ving) .
synw(urge,n) .
synw(urge,v) .
synw(urge,vp) .
synw(urged,ved) .
synw(urged,ven) .
synw(urges,vp) .
synw(urging,n) .
synw(urging,ving) .
% the following are verbs connected with complexes
synw(form,v) . .

synw(form, vp) .
synw(forms, vp) .
synw(formed, ved) .
synw(formed, ven) .
synw(forming, n) .
synw(formation, n) .
synw(assemble, v) .
synw(assemble, vp) .
synw(assembles, vp) .
synw(assembled, ved) .
synw(assembled, ven) .
synw(assembling, n) .
synw(assembly, n) .
synw(dissassemble, v) .
synw(dissassemble, vp) .
synw(dissassembles, vp) .
synw(dissassembled, ved) .
synw(dissassembled, ven) .
synw(dissassembling, n) .
synw(dissassembly, n) .
synw(dissociate, v) .
synw(dissociate, vp) .
synw(dissociates, vp) .
synw(dissociated, ved) .
synw(dissociated, ven) .
synw(dissociating, n) .
synw(dissociation, n) .
synw(recruit, v) .
synw(recruit, vp) .
synw(recruits, vp) .
synw(recruited, ved) .
synw(recruited, ven) .
synw(recruiting, n) .
synw(recruitment, n) .

```

% lexsemact.pat
% revised March 17, 2000
%
%           SEMANTIC LEXICON OF ACTIONS
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% For genomics - the grammar tests for semantic and syntactic cate
gories
% separately for action type of categories; for substances the lex
ical
% entries are the same as in the medical area
% action type phrases have two entries: a semantic entry and a syn
tactic entry
% This lexicon contains the semantic entries for words and phrases

% semp is a lexical entry for phrasal lexicon
% semp(+Word1,+Sem,+Wordlist,+Targetform,+Features)
% semp specifies a semantic lexical definition for the genomics li
terature
% semp is equivalent to the predicate "phrase" in the medical area
% semp: Word1 is first word of phrase, Sem is semantic category
% semp: Wordlist is list of words in phrase, Targetform is output
form
% semp: Features is a list of 2 elements or the atom "def" represe
nting default
% semp: Features 1st element is rev or nrev meaning reversed or no
t reversed
% semp: Features 2nd element is a # specifying number of arguments
for action
% semp: Features = def is equivalent to a list = [nrev,2]
% in case action has 1 argument, use [1,_]

%semw is a lexical entry for single word
% semw(+Word,+Sem,+Targetform,+Features)
% semw: the arguments are the same as for semp except there is no
Wordlist
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

:- multifile(semp/5).
:- multifile(semw/4).

semp(account,cause,[account,for],cause,[def]).
semp(accounted,cause,[accounted,for],cause,[def]).

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semp(accounting,cause,[accounting,for],cause,[def]).
semp(accounts,cause,[accounts,for],cause,[def]).
semp(add, attach, [add, up], attach, [def]).
semp(added, attach, [added, up], attach, [def]).
semp(adds, attach, [adds, up], attach, [def]).
semp(are, cause, [are,a,means,of, producing],cause,[def]).
semp(are,cause,[are,due,to],cause,[2,rev]).
semp(as,cause,[as,a,result,of],cause,[2,rev]).
semp(attributable,cause,[attributable,to],cause,[2,rev]).
semp(attributed,cause,[attributed,to],cause,[2,rev]).
semp(based,cause,[based,on],cause,[2,rev]).
semp(based,cause,[based,upon],cause,[2,rev]).
semp(because,cause,[because,of],cause,[2,rev]).
semp(convey, signal, [conveys,a, signal], signal, [def]).
semp(conveyed, signal, [conveyed,a, signal], signal, [def]).
semp(conveying, signal, [conveying, a, signal], signal, [def]).
semp(conveys, signal, [conveys,a, signal],signal,[def]).
semp(dissociate, release, [dissociate, from], release,[def]).
semp(dissociated, release, [dissociated,from], release,[def]).
semp(dissociates, release, [dissociates, from], release,[def]).
semp(dissociation, release, [dissociation, from], release,[def]).
semp(down,signal,[down,'-',regulate], signal, [def]). % A down-
regulates B      A --> B
semp(down,signal,[down,'-',regulated], signal, [def]). % A down
-regulates B      A --> B
semp(down,signal,[down,'-',regulates], signal, [def]). % A down
-regulates B      A --> B
semp(down,signal,[down,'-',regulation], signal, [def]). % A dow
n-regulates B      A --> B
semp(due,cause,[due,to,the,fact,that],cause,[2,rev]).
semp(due,cause,[due,to],cause,[2,rev]).
semp(form, attach, [form, complex], attach, [def]).
semp(formation, attach, [formation, of, complex], attach, [def]).
semp(formed, attach, [formed, complex], attach, [def]).
semp(forms, attach, [forms, complex], attach, [def]).
semp(had, cause, [had,an,active,role,in],cause,[def]).
semp(has, cause, [has,an,active,role,in],cause,[def]).
semp(have, cause, [have,an,active,role,in],cause,[def]).
semp(is, cause, [is,a,means,of, producing],cause,[def]).
semp(is,cause,[is,due,to],cause,[2,rev]).
semp(functions,inactivate,[functions,as,a,negative,regulator,of],i
nactivate,[def]).
semp(function,inactivate,[function,as,a,negative,regulator,of],ina

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ctivate, [def])).
semp(lead, cause, [lead,to], cause, [def])).
semp(lead, cause1, [lead,to], cause, [def])).
semp(leading, cause, [leading,to], cause, [def])).
semp(leading, cause, [leading,to], cause, [def])).
semp(leads, cause, [leads,to], cause, [def])).
semp(leads, cause1, [leads,to], cause, [def])).
semp(led, cause, [led,to], cause, [def])).
semp(may, cause, [may,be,responsible,for], cause, [def])).
semp(mediate, signal, [mediate, a, signal], signal, [def])).      %A
mediates a signal to B
semp(mediated, signal, [mediated, a, signal], signal, [def])).      %
A mediates a signal to B
semp(mediates, signal, [mediates, a, signal], signal, [def])).      %
A mediates a signal to B
semp(mediation, signal, [mediation,of, a, signal], signal, [def])).
    %A mediates a signal to B
semp(n, createbond, [n, '-', acetylate], 'N-acetylate', [def])).
semp(n, createbond, [n, '-', acetylated], 'N-acetylate', [def])).
semp(n, createbond, [n, '-', acetylates], 'N-acetylate', [def])).
semp(n, createbond, [n, '-', acetylation], 'N-acetylate', [def])).
semp(n, createbond, [n, '-', acylate], 'N-acylate', [def])).
semp(n, createbond, [n, '-', acylated], 'N-acylate', [def])).
semp(n, createbond, [n, '-', acylates], 'N-acylate', [def])).
semp(n, createbond, [n, '-', acylation], 'N-acylate', [def])).
semp(n, createbond, [n, '-', glycosylate], 'N-glycosylate', [def])).
semp(n, createbond, [n, '-', glycosylated], 'N-glycosylate', [def])).
semp(n, createbond, [n, '-', glycosylates], 'N-glycosylate', [def])).
semp(n, createbond, [n, '-', glycosylation], 'N-glycosylate', [def])).
semp(n, breakbond, [n, '-', terminal, proteolysis], 'n-terminal proteoly
sis', [def])).
semp(o, createbond, [o, '-', glycosylate], 'O-glycosylate', [def])).
semp(o, createbond, [o, '-', glycosylated], 'O-glycosylate', [def])).
semp(o, createbond, [o, '-', glycosylates], 'O-glycosylate', [def])).
semp(o, createbond, [o, '-', glycosylation], 'O-glycosylate', [def])).
semp(only, time, [only, after], 'only after', [2, rev])).
semp(prolyl, createbond, [prolyl, '-', 4, '-', hydroxylate],
    'prolyl-4-hydroxylate', [def])).
semp(prolyl, createbond, [prolyl, '-', 4, '-', hydroxylated],
    'prolyl-4-hydroxylate', [def])).
semp(prolyl, createbond, [prolyl, '-', 4, '-', hydroxylates],
    'prolyl-4-hydroxylate', [def])).
semp(prolyl, createbond, [prolyl, '-', 4, '-', hydroxylation],

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        'prolyl-4-hydroxylate', [def])).
semp(result, cause, [result, from], cause, [2, rev]).
semp(result, cause, [result, in], cause, [def]).
semp(resulted, cause, [resulted, from], cause, [2, rev]).
semp(resulted, cause, [resulted, in], cause, [def]).
semp(resulting, cause, [resulting, from], cause, [2, rev]).
semp(resulting, cause, [resulting, in], cause, [def]).
semp(results, cause, [results, from], cause, [2, rev]).
semp(results, cause, [results, in], cause, [def]).
semp(set, release, [set, free], release, [def]).
semp(set, release, [set, free], release, [def]).
semp(sets, release, [sets, free], release, [def]).
semp(setting, release, [setting, free], release, [def]).
semp(suppress, inactivate, [suppress, activity, of], inactivate, [
def]).
semp(suppressed, inactivate, [suppressed, activity, of], inactivat
e, [def]).
semp(suppresses, inactivate, [suppresses, activity, of], inactivat
e, [def]).
semp(suppression, inactivate, [suppression, of, activity, of], inac
tivate, [def]).
semp(switch, activate, [switch, on, the, activity, of], activate
, [def]).
semp(switched, activate, [switched, on, the, activity, of], acti
vate, [def]).
semp(swatches, activate, [swatches, on, the, activity, of], acti
vate, [def]).
semp(up, signal, [up, '-', regulate], signal, [2, rev]). % A up-regul
ates B B --> A
semp(up, signal, [up, '-', regulated], signal, [2, rev]).
semp(up, signal, [up, '-', regulates], signal, [2, rev]).
semp(up, signal, [up, '-', regulation], signal, [2, rev]).
semp(was, cause, [was, a, means, of, producing], cause, [def]).
semp(was, cause, [was, due, to], cause, [2, rev]).
semp(were, cause, [were, a, means, of, producing], cause, [def]).
semp(were, cause, [were, due, to], cause, [2, rev]).
semw(acetylate, createbond, acetylate, [def]).
semw(acetylated, createbond, acetylate, [def]).
semw(acetylates, createbond, acetylate, [def]).
semw(acetylation, createbond, acetylate, [def]).
semw(activate, activate, activate, [def]).
semw(activated, activate, activate, [def]).
semw(activates, activate, activate, [def]).

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semw(activation, activate, activate, [def]).
semw(add, attach, attach, [def]).
semw(added, attach, attach, [def]).
semw(addition, attach, attach, [def]).
semw(adds, attach, attach, [def]).
semw(after, time, after, [2, rev]). % temporal relations
semw(aggregate, attach, attach, [def]).
semw(aggregated, attach, attach, [def]).
semw(aggregates, attach, attach, [def]).
semw(aggregation, attach, attach, [def]).
semw(arrest, inactivate, inactivate, [def]).
semw(arrested, inactivate, inactivate, [def]).
semw(arrests, inactivate, inactivate, [def]).
semw(associate, attach, attach, [def]).
semw(associated, attach, attach, [def]).
semw(associates, attach, attach, [def]).
semw(association, attach, attach, [def]).
semw(attach, attach, attach, [def]).
semw(attached, attach, attach, [def]).
semw(attaches, attach, attach, [def]).
semw(attachment, attach, attach, [def]).
semw(bind, attach, attach, [def]).
semw(binding, attach, attach, [def]).
semw(binds, attach, attach, [def]).
semw(block, inactivate, inactivate, [def]).
semw(blocked, inactivate, inactivate, [def]).
semw(blocking, inactivate, inactivate, [def]).
semw(blocks, inactivate, inactivate, [def]).
semw(bound, attach, attach, [def]).
semw(break, breakbond, 'break bond', [def]).
semw(breakage, breakbond, 'break bond', [def]).
semw(breaks, breakbond, 'break bond', [def]).
semw(broke, breakbond, 'break bond', [def]).
semw(broken, breakbond, 'break bond', [def]). % case without break
bond
semw(catalyzation, promote, catalyze, [def]).
semw(catalyze, promote, catalyze, [def]).
semw(catalyzed, promote, catalyze, [def]).
semw(catalyzes, promote, catalyze, [def]).
semw(catalyzing, promote, catalyze, [def]).
semw(cause, cause, cause, [def]).
semw(caused, cause, cause, [def]).
semw(causes, cause, cause, [def]).

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semw(cleavage, breakbond, 'break bond', [def]).
semw(cleave, breakbond, 'break bond', [def]).
semw(cleaved, breakbond, 'break bond', [def]).
semw(cleaves, breakbond, 'break bond', [def]).
semw(coimmunoprecipitate, attach, attach, [def]).
semw(coimmunoprecipitated, attach, attach, [def]).
semw(coimmunoprecipitates, attach, attach, [def]).
semw(coimmunoprecipitation, attach, attach, [def]).
semw(combination, attach, attach, [def]).
semw(combine, attach, attach, [def]).
semw(combined, attach, attach, [def]).
semw(combines, attach, attach, [def]).
semw(conjugate, attach, attach, [def]).
semw(conjugated, attach, attach, [def]).
semw(conjugates, attach, attach, [def]).
semw(conjugation, attach, attach, [def]).
semw(connect, attach, attach, [def]).
semw(connected, attach, attach, [def]).
semw(connection, attach, attach, [def]).
semw(connects, attach, attach, [def]).
semw(constrain, inactivate, inactivate, [def]).
semw(constrained, inactivate, inactivate, [def]).
semw(constrains, inactivate, inactivate, [def]).
semw(constraint, inactivate, inactivate, [def]).
semw(coprecipitate, attach, attach, [def]).
semw(coprecipitated, attach, attach, [def]).
semw(coprecipitates, attach, attach, [def]).
semw(coprecipitation, attach, attach, [def]).
semw(copurification, attach, attach, [def]).
semw(copurified, attach, attach, [def]).
semw(copurifies, attach, attach, [def]).
semw(copurify, attach, attach, [def]).
semw(couple, attach, attach, [def]).
semw(coupled, attach, attach, [def]).
semw(couples, attach, attach, [def]).
semw(cut, breakbond, 'break bond', [def]). % leave breakbond only
y?
semw(cuts, breakbond, 'break bond', [def]).
semw(deactivate, inactivate, inactivate, [def]).
semw(deactivated, inactivate, inactivate, [def]).
semw(deactivates, inactivate, inactivate, [def]).
semw(deactivation, inactivate, inactivate, [def]).
semw(death, process, death, [1]).

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semw(demethylate, breakbond, demethylate, [def]).
semw(demethylated, breakbond, demethylate, [def]).
semw(demethylates, breakbond, demethylate, [def]).
semw(demethylation, breakbond, demethylate, [def]).
semw(dephosphorylate, breakbond, dephosphorylate, [def]).
semw(dephosphorylated, breakbond, dephosphorylate, [def]).
semw(dephosphorylates, breakbond, dephosphorylate, [def]).
semw(dephosphorylation, breakbond, dephosphorylate, [def]).
semw(die, process, death, [1]).
semw(died, process, death, [1]).
semw(dies, process, death, [1]).
semw(disassemble, release, release, [def]).
semw(disassembled, release, release, [def]).
semw(disassembles, release, release, [def]).
semw(disassembly, release, release, [def]).
semw(discharge, release, release, [def]).
semw(discharged, release, release, [def]).
semw(discharges, release, release, [def]).
semw(disengage, release, release, [def]).
semw(disengaged, release, release, [def]).
semw(disengagement, release, release, [def]).
semw(disengages, release, release, [def]).
semw(divide, breakbond, 'break bond', [def]).
semw(divided, breakbond, 'break bond', [def]).
semw(divides, breakbond, 'break bond', [def]).
semw(division, breakbond, 'break bond', [def]).
semw(dying, process, death, [1]).
semw(enhance, promote, promote, [def]).
semw(enhanced, promote, promote, [def]).
semw(enhancement, promote, promote, [def]).
semw(enhances, promote, promote, [def]).
semw(enhancing, promote, promote, [def]).
semw(express, generate, express, [def]). % can have either 1 or 2 arguments
semw(expressed, generate, express, [def]).
semw(expresses, generate, express, [def]).
semw(expressing, generate, express, [def]).
semw(expression, generate, express, [def]).
semw(generate, generate, generate, [def]).
semw(generated, generate, generate, [def]).
semw(generates, generate, generate, [def]).
semw(generating, generate, generate, [def]).
semw(generation, generate, generate, [def]).

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semw(hew, breakbond, 'break bond', [def]).
semw(hewed, breakbond, 'break bond', [def]).
semw(hews, breakbond, 'break bond', [def]).
semw(hinder, inactivate, inactivate, [def]).
semw(hindered, inactivate, inactivate, [def]).
semw(hinders, inactivate, inactivate, [def]).
semw(hindrance, inactivate, inactivate, [def]).
semw(inactivate, inactivate, inactivate, [def]).
semw(inactivated, inactivate, inactivate, [def]).
semw(inactivates, inactivate, inactivate, [def]).
semw(inactivation, inactivate, inactivate, [def]).
semw(incite, activate, activate, [def]).
semw(incited, activate, activate, [def]).
semw(incitement, activate, activate, [def]).
semw(incites, activate, activate, [def]).
semw(induce, activate, activate, [def]).
semw(induced, activate, activate, [def]).
semw(induces, activate, activate, [def]).
semw(induction, activate, activate, [def]).
semw(influence, activate, activate, [def]).
semw(influenced, activate, activate, [def]).
semw(influences, activate, activate, [def]).
semw(influencing, activate, activate, [def]).
semw(inhibit, inactivate, inactivate, [def]).
semw(inhibited, inactivate, inactivate, [def]).
semw(inhibition, inactivate, inactivate, [def]).
semw(inhibits, inactivate, inactivate, [def]).
semw(initiate, activate, activate, [def]).
semw(initiated, activate, activate, [def]).
semw(initiates, activate, activate, [def]).
semw(initiattion, activate, activate, [def]).
semw(instigate, activate, activate, [def]).
semw(instigated, activate, activate, [def]).
semw(instigates, activate, activate, [def]).
semw(instigation, activate, activate, [def]).
semw(interact, interact, interact, [def]).
semw(interacted, interact, interact, [def]).
semw(interaction, interact, interact, [def]).
semw(interactions, interact, interact, [def]).
semw(interacts, react, interact, [def]).
semw(join ,attach,attach, [def]).
semw(joined ,attach, attach, [def]).
semw(joining, attach, attach, [def]).

semw(joins, attach, attach, [def]).
semw(juncture, attach, attach, [def]).
semw(liberate, release, release, [def]).
semw(liberated, release, release, [def]).
semw(liberalizes, release, release, [def]).
semw(liberation, release, release, [def]).
semw(limit, inactivate, inactivate, [def]).
semw(limitation, inactivate, inactivate, [def]).
semw(limited, inactivate, inactivate, [def]).
semw(limits, inactivate, inactivate, [def]).
semw(link, attach, attach, [def]).
semw(linked, attach, attach, [def]).
semw(linking, attach, attach, [def]).
semw(links, attach, attach, [def]).
semw(mediate, promote, promote, [def]).
semw(mediated, promote, promote, [def]).
semw(mediates, promote, promote, [def]).
semw(mediation, promote, promote, [def]).
semw(methylate, createbond, methylate, [def]).
semw(methylated, createbond, methylate, [def]).
semw(methylates, createbond, methylate, [def]).
semw(methylation, createbond, methylate, [def]).
semw(modification, modify, modify, [def]).
semw(modified, modify, modify, [def]).
semw(modifies, modify, modify, [def]).
semw(modify, modify, modify, [def]).
semw(modifying, modify, modify, [def]).
semw(mutate, modify, mutate, [1]).
semw(mutated, modify, mutate, [1]).
semw(mutates, modify, mutate, [1]).
semw(mutating, modify, mutate, [1]).
semw(mutation, modify, mutate, [1]).
semw(overexpressed, generate, overexpress, [def]).
semw(overexpresses, generate, overexpress, [def]).
semw(overexpressing, generate, overexpress, [def]).
semw(overexpress, generate, express, [def]).
semw(overexpression, generate, overexpress, [def]).
semw(pair, attach, attach, [def]).
semw(paired, attach, attach, [def]).
semw(pairing, attach, attach, [def]).
semw(pairs, attach, attach, [def]).
semw(phosphorylate, createbond, phosphorylate, [def]).
semw(phosphorylated, createbond, phosphorylate, [def]).

```

semw(phosphorylates, createbond, phosphorylate, [def]).
semw(phosphorylation, createbond, phosphorylate, [def]).
semw(precede, cause, cause, [def]).
semw(preceded, cause, cause, [def]).
semw(precedes, cause, cause, [def]).
semw(preceding, cause, cause, [def]).
semw(promote, promote, promote, [def]).
semw(promoted, promote, promote, [def]).
semw(promotes, promote, promote, [def]).
semw(promotion, promote, promote, [def]).
semw(prompt, activate, activate, [def]).
semw(prompted, activate, activate, [def]).
semw(prompting, activate, activate, [def]).
semw(prompts, activate, activate, [def]).
semw(react, react, react, [def]).
semw(reacted, react, react, [def]).
semw(reaction, react, react, [def]).
semw(reactions, react, react, [def]).
semw(reacts, react, react, [def]).
semw(regulate, signal, signal, [def]).
semw(regulated, signal, signal, [def]).
A   A --> B
semw(regulates, signal, signal, [def]).
semw(regulation, signal, signal, [def]).
semw(release, release, release, [def]).
semw(released, release, release, [def]).
semw(releases, release, release, [def]).
semw(removal, breakbond, 'break bond ', [def]).
semw(remove, breakbond, 'break bond ', [def]).
semw(removes, breakbond, 'break bond ', [def]).
semw(replace, substitute, substitute, [def]).
semw(replaced, substitute, substitute, [def]).
semw(replacement, substitute, substitute, [def]).
semw(replaces, substitute, substitute, [def]).
semw(repress, inactivate, inactivate, [def]).
semw(repressed, inactivate, inactivate, [def]).
semw(represses, inactivate, inactivate, [def]).
semw(repression, inactivate, inactivate, [def]).
semw(require, cause, cause, [2, rev]).
semw(required, cause, cause, [2, rev]).
semw(requirement, cause, cause, [2, rev]).
semw(requires, cause, cause, [2, rev]).

```

% B is regulated by

semw(requiring, cause, cause, [2, rev]).
semw(restrain, inactivate, inactivate, [def]).
semw(restrained, inactivate, inactivate, [def]).
semw(restrains, inactivate, inactivate, [def]).
semw(restraint, inactivate, inactivate, [def]).
semw(sensitization, activate, activate, [def]).
semw(sensitize, activate, activate, [def]).
semw(sensitized, activate, activate, [def]).
semw(sensitizes, activate, activate, [def]).
semw(separate, breakbond, 'break bond', [def]).
semw(separated, breakbond, 'break bond', [def]).
semw(separates, breakbond, 'break bond', [def]).
semw(separation, breakbond, 'break bond', [def]).
semw(sever, breakbond, 'break bond', [def]).
semw(severance, breakbond, 'break bond', [def]).
semw(severed, breakbond, 'break bond', [def]).
semw(severs, breakbond, 'break bond', [def]).
semw(signal, signal, signal, [def]).
semw(signaled, signal, signal, [def]).
semw(signaling, signal, signal, [def]).
semw(signals, signal, signal, [def]).
semw(split, breakbond, 'break bond', [def]).
semw(splits, breakbond, 'break bond', [def]).
semw(splitting, breakbond, 'break bond', [def]).
semw(stimulate, activate, activate, [def]).
semw(stimulated, activate, activate, [def]).
semw(stimulates, activate, activate, [def]).
semw(stimulation, activate, activate, [def]).
semw(substitute, substitute, substitute, [def]).
semw(substituted, substitute, substitute, [def]).
semw(substitutes, substitute, substitute, [def]).
semw(substitution, substitute, substitute, [def]).
semw(suppress, inactivate, inactivate, [def]).
semw(suppressed, inactivate, inactivate, [def]).
semw(suppresses, inactivate, inactivate, [def]).
semw(suppression, inactivate, inactivate, [def]).
semw(tie, attach, attach, [def]).
semw(tied, attach, attach, [def]).
semw(ties, attach, attach, [def]).
semw(transcribe, generate, transcribe, [def]).
semw(transcribed, generate, transcribe, [def]).
semw(transcribes, generate, transcribe, [def]).
semw(transcribing, generate, transcribe, [def]).

semw(transcription,generate,transcribe,[def])).
semw(ubiquitinize,createbond,ubiquitinize,[def])).
semw(ubiquitinize,createbond,ubiquitinize,[def])).
semw(ubiquitinized,createbond,ubiquitinize,[def])).
semw(ubiquitinizes,createbond,ubiquitinize,[def])).
semw(urge,activate,activate,[def])).
semw(urge,activate,activate,[def])).
semw(urged,activate,activate,[def])).
semw(urges,activate,activate,[def])).
semw(urging,activate,activate,[def])).
semw(form,attach,attach,[def])).
semw(forms,attach,attach,[def])).
semw(formed,attach,attach,[def])).
semw(forming,attach,attach,[def])).
semw(formation,attach,attach,[def])).
semw(assemble,attach,attach,[def])).
semw(assembles,attach,attach,[def])).
semw(assembled,attach,attach,[def])).
semw(assembling,attach,attach,[def])).
semw(assembly,attach,attach,[def])).
semw(dissassemble,release,release,[def])).
semw(dissassembles,release,release,[def])).
semw(dissassembled,release,release,[def])).
semw(dissassembling,release,release,[def])).
semw(dissassembly,release,release,[def])).
semw(dissociate,release,release,[def])).
semw(dissociates,release,release,[def])).
semw(dissociated,release,release,[def])).
semw(dissociating,release,release,[def])).
semw(dissociation,release,release,[def])).
semw(recruit,attach,attach,[def])).
semw(recruits,attach,attach,[def])).
semw(recruited,attach,attach,[def])).
semw(recruiting,attach,attach,[def])).
semw(recruitment,attach,attach,[def])).

```

% edited Genome grammar - adapted from MedLEE's grammar for use with MedLEE
% this is to be used along with the genomics lexicon of substances, actions,
% and relations.
% revised March 16, April 5, 2000
% adjusted for tagged input
:- multifile(wdef/3).
:- multifile(phrase/5).
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Semantic Grammar for Genomics %%%%%%%%%%
%
%   Written by Carol Friedman for the MedLEE System
%
%   Queens College of the City University of New York
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Highest Level Predicate - sem_sent - 1st arg. is target structure
%                               - 2nd arg. is a list of words in sentence
%                               - 3rd arg. is '[]'
% Target structure: a frame or set of connected frames:
%   the frame describes an action or several related actions;
%   an action frame is a list consisting of the symbol 'action'
%   followed by the code for the action and arguments.
%   The arguments are either substances or actions;
%   each substance slot consists of the name of the type of
%   substance followed by the value for the substance;
%   the substance slot may contain slots for several substances.
% Examples:
% Blocking of il-2 gene transcription by activated rap1.
% [action,inactivate,[protein,Rap1,[state,active]],
%   [action,transcribe,[x],[gene,interleukin-2]]]
%
% The adapter protein crkl was associated with both phosphorylated cbl and the
% guanidine nucleotide-releasing factor c3g.
% [action,attach,[protein,Crkl],
%   [relation,and,[protein,Cbl,[state,phosphorylated]],
%   [protein,guanidine nucleotide-releasing factor C3G,
%   [state,phosphorylated]]]]
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% fail an unknown predicate
:- unknown(_,fail).
:- op(900, fy, [not,once]). % same priority and type as \+
:- op(700, xfx, [\=,~=]). % same priority and type as = or ==
% snoop is generally used to find input string when using a DCG
%   the input string is used for constraints
snoop(A,B,A,B).

sem_sent(P,Semlist,X) -->
    {assert(addstotal(0))},
    sem_parse(P,Semlist,X).
sem_parse(Target,Semlist) -->
    sem_patterns(P,Semlist).
sem_parse(Target,Semlist,X) -->
    sem_patterns(P,Semlist),
    sem_endornot(P,Target,X).

sem_parse([failure],_,X,_,_) :-
    addstotal(X).
sem_endornot(P,P,X) --> % P is target if there is an endmark

```

Appendix D

```

sem_endmark,
{addstotal(X)}. % X is number of times reached endmark
sem_endornot(,_,_,_,_) :- % did not reach endmark; update count and fail
    uptotal, fail.
sem_endornot(, [failure], X,_,_) :-
    addstotal(X), % X is number of times reached
    X >= 50.

```

```

% Finding patterns

```

```

sem_patterns(F, Semlist) -->
    pattern(F1, Semlist),
    {F1 \= []}, % 1st finding should not be empty
    morepattern(R, F2, Semlist), % connected patterns
    {getrelation(R, F1, F2, F)}.

```

```

/*****
* The action pattern types are: pattern, nounactionpatt, actpatt, and *
* nounactpatt. *
* pattern --> actionarg(A1) *
*           active or passive verb *
*           actionarg(A2). *
* pattern --> nounactionpatt. *
* pattern --> actpatt. *
*****/

```

```

% pattern is saved in a symbol table (st); check for success/failure 1st
% Case where pattern is in st and has been successful
pattern(Fmt,_) --> checkst(pattern,_,s,Fmt).
% Case where pattern is in st as a failure.
pattern(,_) --> checkst(pattern,_,f,_, {!, fail}).

```

```

% pattern 5: an action pattern with a nominal verb
% Psl cleavage by zvad.
% apoptosis-induced cleavage of PS2 by zDEVd.
pattern(F, Semlist) -->
    snoop(S0, S0),
    { \+ checkst(pattern, 5,_,_,S0,_) ,
      actionchk(Semlist) },
    nounactionpatt(F),
    snoop(S, S),
    { addst(pattern, 5, s, F, S0, S)
    }.

```

```

% pattern 1: an action/substance acts on an action/substance
% the activation of rap1 inhibits the expression of il-2
% rap1 functions as a negative regulator of tcr-mediated il-2 gene
% transcription.
pattern(F, Semlist) --> snoop(S0, S0), % S0 is the input string
    { \+ checkst(pattern, 1,_,_,S0,_) ,
      actionchk(Semlist),
      connectchk(Semlist) },
    actionarg(A1),

```

```

connectact(Sem, [v, vp, ved], Target, Features),
actionarg(A2),
snoop(S, S), %ending sentence list
{ member(def, Features),
  modlist([A1, A2, Site], Mods);
  member(rev, Features),
  modlist([A2, A1, Site], Mods);
  frame(F, action, Target, Mods),
  addst(pattern, 1, s, F, S0, S)
}.

% pattern 2: an action/substance was acted on by an action/substance
% The aggregation of bad was suppressed.
% The aggregation of bad was suppressed by the phosphorylation of jnk.
% Grb2 was associated with Cbl.
% Apoptosis-associated cleavage of endogenous PS1 was blocked by the
% treatment with zVAD.
pattern(F, Semlist) -->
  snoop(S0, S0), % S0 is the input string
  { \+ checkst(pattern, 2, _, _, S0, _),
    actionchk(Semlist),
    connectchk(Semlist) },
  actionarg(A2),
  sem_beterm(_), % was
  connectact(Sem, [ven], Target, Features), %activated
  optbyarg(A1),
  snoop(S, S), %ending sentence list
  { (member(def, Features),
    modlist([A1, A2, Site], Mods);
    member(rev, Features),
    modlist([A2, A1, Site], Mods);
    frame(F, action, Target, Mods),
    addst(pattern, 2, s, F, S0, S)
  }).

% pattern 3: an action/substance acted on an action/substance
% bad induced phosphorylation of fyn.
% tcr and cd28-mediated il-2 transcription.
pattern(F, Semlist) -->
  snoop(S0, S0),
  { \+ checkst(pattern, 3, _, _, S0, _),
    actionchk(Semlist),
    connectchk(Semlist) },
  actionarg(A1), % substance or basic action
  % optdash,
  connectacts(Sem, [vp, ven, ved], Target, Features), % 'activated'
  % optof,
  actionarg(A2), % had pattern here
  snoop(S, S),
  { (member(def, Features),
    modlist([A1, A2, Site], Mods);
    member(rev, Features),
    modlist([A2, A1, Site], Mods);
    frame(F, action, Target, Mods),
    addst(pattern, 3, s, F, S0, S)
  }).

```



```

% pattern 4: a simple action pattern with an active verb.
% Activated Raf-1 phosphorylates MEK-1.
pattern(F,Semlist) -->
    snoop(S0,S0),
    %check that sentence has an action word/phrase
    { \+ checkst(pattern, 4,_,_,S0,_),
      actionchk(Semlist) },
    actpatt(F),
    snoop(S,S),
    { addst(pattern,4,s,F,S0,S)
    }.

% no more patterns - save failure
pattern(,_ _) --> addst(pattern,0,f,_), {!, fail}.

% sem_morepattern(-Rel,-P,+Semlist,+S0,+S):
%   Rel is a relation and its value frame;
%   P is the remaining patterns, Semlist is the list of semantic classes
%   in sentence
% if have a series of ','s, use the relation "and" or "or" if in the nest
% and make that the relation
morepattern(R,F,Semlist) -->
    sem_relation(R1,Mod1), %relation and modifiers
    sem_patterns(F,Semlist),
    { ( frame(F,rel,Conj2,_), % F contains nested relation
      (Conj2 = and; Conj2 = or), frame(R1,rel,',',_), % R1 relation frame
      frame(R,rel,Conj2,_), % value of relation is Conj2
      ;
      R1 \= [], % where do Type, Value and Mods2 come from?
      frame(R1,Type,Value,Mod2), % get components of original relation
      mergemods(Mod1,Mod2,Mods),
      ( Mods = [], frame(R,rel,Value,[]), !;
        %frame(R,rel,[Value|Mods],[]) % make it rel connector with rel mod
        R = [rel,[Value|Mods]]
      )
    }
    }.

% no more findings
morepattern([],[],_,S,S).

% actionarg is the argument of pattern
% actionarg is either a substance or a basic action

% actionarg is saved in a symbol table (st); check for success/failure 1st
% Case where actionarg is in st and have been successful
actionarg(A) --> checkst(actionarg,_,s,A).
% Case where actionarg is in st as a failure.
actionarg(_) --> checkst(actionarg,_,f,_), {!, fail}.

% actionarg 1: a substance or substances
% Rap1, active Rap1, Cbl and Crkl
actionarg(A) --> snoop(S0,S0), % S0 is the input string
    { \+ checkst(actionarg,1,_,_,S0,_),
      substances(A),
      snoop(S,S),
      { addst(actionarg,1,s,A,S0,S) }
    }.

```

```

% actionarg 2: a process like apoptosis, or a disease
actionarg(A) --> snoop(S0,S0), % S0 is the input string
    { \+ checkst(actionarg,2,_,_,S0,_)},
    processpatt(A),
    snoop(S,S),
    { addst(actionarg,2,s,A,S0,S)
    }.

```

```

% actionarg 3: a nominal action pattern
% Etoposide-induced apoptosis.
% Etoposide-induced PS1 cleavage by zVAD.
actionarg(A) --> snoop(S0,S0), % S0 is the input string
    { \+ checkst(actionarg,3,_,_,S0,_)},
    nounactionpatt(A),
    snoop(S,S),
    {addst(actionarg,3,s,A,S0,S)
    }.

```

```

% actionarg 4: the object of the nominal action is an actionarg
% Blocking of IL-2 Gene transcription by activated rap1.
actionarg(A) --> snoop(S0,S0), % S0 is the input string
    { \+ checkst(actionarg,4,_,_,S0,_)},
    action(Sem,[n,ving],Target,Features),
    [of],
    actionarg(A1),
    optbyagent(A2),
    snoop(S,S),
    { (member(def, Features),
      modlist([A1,A2],Mods);
      member(rev,Features),
      modlist([A2,A1],Mods)),
      frame(A,action,Target,Mods),
      addst(actionarg,4,s,A,S0,S)
    }.

```

```

% no more actionarg - save failure
actionarg(_) --> addst(actionarg,0,f,_), {!, fail}.

```

```

% nounactionpatt is a nominal action pattern which allows for left and right
% modifiers
% IL-2 gene transcription mediated by tcr and cd28 was inhibited by rap1.
% Activated rap1 functions as a negative regulator of tcr and cd-28-mediated
il_2 transcription.
% nounactionpatt is saved in a symbol table (st); check for success/failure 1st
% Case where nounactionpatt is in st and has been successful
nounactionpatt(A) --> checkst(nounactionpatt,_,s,A).
% Case where nounactionpatt is in st as a failure.
nounactionpatt(_) --> checkst(nounactionpatt,_,f,_), {!, fail}.

```

```

nounactionpatt(P) --> snoop(S0,S0), % S0 is the input string
    { \+ checkst(nounactionpatt,1,_,_,S0,_)},
    actionlmod(L,Syn1),
    nounactionunit(A),
    actionrmod(R, Syn2),

```

```

        snoop(S,S),
        { (Syn1 = ved, append(R,[A], RA),
          append(L, RA, P);
          Syn1 = ving, append(R, [A], RA),
          L = [action,Verb,Object],
          modlist(RA, Object, Mods),
          frame(P, action, Verb, Mods)),
          addst(nounactionpatt,1,s,P,S0,S) }.
% no more nounactionpatt - save failure
nounactionpatt(_) --> addst(nounactionpatt,0,f,_), {!, fail}.

% the central unit of the nounactionpatt is a nounactpatt or a process
nounactionunit(A) --> nounactpatt(A).
nounactionunit(A) --> process(A).

% left modifiers of nounactpatt
% Zvad-inhibited cleavage pf Ps1
actionlmod(L,ved) --> substances(S),
    optdash,
    action(Sem,[ved],Target,Features ),
    { frame(L, action, Target, [S]) }.

% apoptosis induced cleavage of ps2
actionlmod(L,ved) --> process(S),
    optdash,
    action(Sem,[ved],Target,Features ),
    { frame(L, action, Target, [S]) }.

% apoptosis causing cleavage of Ps1 by Zvad.
% need to invert the order of nounactpatt and actionlmod
actionlmod(L,ving) --> processobject(A), % process or nounacpatt,
    action(Sem,[ving],Target,Features),
    { frame(L,action, Target,A) }.

actionlmod([],_) --> [].

actionrmod(R,ved) --> action(Sem,[ved],Target,Features),
    byagent(A), % may have to add ving to actionrmod
    { frame(R,action, Sem, A) }.
actionrmod([],_) --> [].

%
% actpatt parses a simple action between substances expressed by an active verb
%
% actpatt is saved in a symbol table (st); check for success/failure % % 1st
% Case where actpatt is in st and has been successful
actpatt(F) --> checkst(actpatt,_,s,F).
% Case where actpatt is in st as a failure.
actpatt(_) --> checkst(actpatt,_,f,_), {!, fail}.

% actpatt 1: substance acts on substance
% PDK1 phosphorylates p70s6k at Thr229
actpatt(F) -->
    snoop(S0,S0), % S0 is the input string
    { \+ checkst(actpatt,1,_,_,S0,_) },

```

```

    substances(A1),
    sem_whichrel,      % opt 'that'
    action(Semclass, [vp, ved], Target, Features),
    prepopt, % added prepopt to allow action 'to' and 'with' substance
    substances(A2),
    siteinfo(Site),
    snoop(S, S),
    { (member(def, Features),
      modlist([A1, A2, Site], Mods);
      member(rev, Features),
      modlist([A2, A1, Site], Mods)),
      frame(F, action, Target, Mods),
      addst(actpatt, 1, s, F, S0, S)
    }.

% actpatt 2:
% Substance was bound by Substance
% Substance was associated to substance.
% F can give either first or second place to the second argument;
% a byagent gets first position; prepagent gets second.
% Phosphorylated Fyn was associated with Cbl.

actpatt(F) -->
    snoop(S0, S0), % S0 is the input string
    { \+ checkst(actpatt, 2, _, _, S0, _)},
    substances(A1),
    sem_beterm(_),
    action(Semclass, [ven], Target, Features),
    optbyorprepagent(Position, A2),
    snoop(S, S),
    { (member(def, Features),
      (Position=second, modlist([A1, A2, Site], Mods);
       Position=first, modlist([A2, A1, Site], Mods));
      member(rev, Features),
      (Position=second, modlist([A2, A1, Site], Mods);
       Position=first, modlist([A1, A2, Site], Mods))),
      frame(F, action, Target, Mods),
      addst(actpatt, 2, s, F, S0, S)
    }.

% no more actpatt - save failure
actpatt(_) --> addst(actpatt, 0, f, _), {!, fail}.

%
% nounactpatt parses a simple action between substances expressed by a nominal
% verb
%
% nounactpatt is saved in a symbol table (st); check for success/failure 1st
% Case where nounactpatt is in st and have been successful
nounactpatt(Fmt) --> checkst(nounactpatt, _, s, Fmt).
% Case where nounactpatt is in st as a failure.
nounactpatt(_) --> checkst(nounactpatt, _, f, _), {!, fail}.

% nounactpatt 1:
% Jnk phosphorylation of Bad
nounactpatt(F) -->
    snoop(S0, S0), % S0 is the input string

```

```

{ \+ checkst(nounactpatt,1,_,_,S0,_) },
  substances(A1),
  {aminoacidtest(A1)},
  optdash,
  action(Semclass,[n],Target,Features),
  ofobject(A2),
%   siteinfo(Site),
  snoop(S,S),
  { (member(def, Features),
    modlist([A1,A2,Site],Mods);
    member(rev,Features),
    modlist([A2,A1,Site],Mods)),
    frame(F,action,Target,Mods),
    addst(nounactpatt,1,s,F,S0,S)
  }.

% nounactpatt 2: the binding of substance and substance
% association of Fyn and Cbl.
% the reason for having this as a separate pattern is to
% prevent 'Fyn and Cbl' from being parsed together as substances
nounactpatt(F) -->
  snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,2,_,_,S0,_) },
  action(attach,[ving,n],Target,Features),
  ofobject1(A1),
  andobject(A2),
%   siteinfo(Site),
  snoop(S,S),
  { modlist([A1,A2,Site],Mods),
    frame(F,action,Target,Mods),
    addst(nounactpatt,2,s,F,S0,S)
  }.

% nounactpatt 3:
% The cleavage of protein by substance.
% Association of phosphorylated Fyn with Cbl
% Tyrosine phosphorylation of Cbl by kinase
% optbyorprepagent determines the order of arguments; byagent is placed first;
% prepagent is placed second
nounactpatt(F) -->
  snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,3,_,_,S0,_) },
  actionof(F),
  snoop(S,S),
  { addst(nounactpatt,3,s,F,S0,S) }.

actionof(F) -->
  siteinfo(Site),
  action(Semclass,[ving,n],Target,Features),
  optofobject(A1),
  optbyorprepagent(Position,A2),
  snoop(S,S),
  { (member(def, Features),
    (Position=second, modlist([A1,A2,Site],Mods);
    Position= first, modlist([A2,A1,Site],Mods));
    member(rev,Features),

```

```

(Position=second, modlist([A2,A1,Site],Mods);
  Position= first, modlist([A1,A2,Site],Mods))),
  frame(F,action,Target,Mods)
}.

% nounactpatt 4:
% Fyn association with Cbl.
nounactpatt(F) -->
  snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,4,_,_,S0,_) },
  substances(A1),
  action(Semclass,[ving,n],Target,Features),
  withobject(A2),
  % siteinfo(Site),
  snoop(S,S),
  { modlist([A1,A2,Site],Mods),
    frame(F,action,Target,Mods),
    addst(nounactpatt,4,s,F,S0,S)
  }.

aminoacidtest(X) :- X \= [aminoacid|_].

% nounactpatt 5:
% IL-2 gene transcription
% Cbl phosphorylation [by substance or action]
nounactpatt(F) -->
  snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,5,_,_,S0,_) },
  substances(A2),
  optdash,
  action(Semclass,[n],Target,Features),
  optbyagent(A1),
  % siteinfo(Site),
  snoop(S,S),
  { (member(def, Features),
    modlist([A1,A2,Site],Mods);
    member(rev,Features),
    modlist([A2,A1,Site],Mods)),
    frame(F,action,Target,Mods),
    addst(nounactpatt,5,s,F,S0,S)
  }.

% nounactpatt 6:
% fyn-cbl association.
nounactpatt(F) -->
  snoop(S0,S0), % S0 is the input string
  { \+ checkst(nounactpatt,6,_,_,S0,_) },
  substances(A1),
  optdash,
  substances(A2),
  action(Semclass,[n,ving],Target,Features),
  % siteinfo(Site),
  snoop(S,S),
  { modlist([A1,A2,Site],Mods),
    frame(F,action,Target,Mods),
    addst(nounactpatt,6,s,F,S0,S)
  }.

```

```

% nounactpatt 7:
% Cbl phosphorylated by fyn.
nounactpatt(F) -->
    snoop(S0,S0), % S0 is the input string
    { \+ checkst(nounactpatt,7,_,_,S0,_)},
    substances(A1),
    action(Semclass,[ven],Target,Features),
    [by],
    substances(A2),
%   siteinfo(Site),
    snoop(S,S),
%   {(member(def, Features),
%   { modlist([A2,A1,Site],Mods),
%   member(rev,Features),
%   modlist([A1,A2,Site],Mods))},
    frame(F,action,Target,Mods),
    addst(nounactpatt,7,s,F,S0,S)
    }.

% no more nounactpatt - save failure
nounactpatt(_) --> addst(nounactpatt,0,f,_), {!, fail}.

connectact(Sem,Syn,Target,Features) -->
    action(Sem,Syn,Target,Features),
    {member(Sem,[cause,cause1,activate,inactivate,signal,substitute,promote])}.

connectacts(Sem,Syn,Target,Features) -->
    connectact(Sem,Syn,Target,Features).

% aminoacid like tyrosine : ex.: tyrosine Cbl phosphorylation
% at position 201 Thr
siteinfo(S) --> aminoacid(A),
    {frame(S,site,[A],[])} .
siteinfo(S) -->
    sitepreps, % 'in', 'at'
    position(S).
siteinfo([]) --> [].
sitepreps --> prepterm(in,_).
sitepreps --> prepterm(at,_).
position(S) --> [position],
    sem_integerterm(I),
    { frame(S,site,I,[])} .

% The definitions of actions refer to the lexicons lexsynact.pl and lexsemact.pl
% Sem is the semantic class; Syn is the syntactic class
% F is the target
% oneaction was added for use with moreaction to allow parsing of conjoined
% actions

oneaction(activate,Syn,F,Features) --> activateterm(Syn,F,Features),{!}.
oneaction(attach,Syn,F,Features) --> attachterm(Syn,F,Features),{!}.
oneaction(breakbond,Syn,F,Features) --> breakbondterm(Syn,F,Features),{!}.

```

```

oneaction(createbond, Syn, F, Features) --> createbondterm(Syn, F, Features), {!}.
oneaction(inactivate, Syn, F, Features) --> inactivateterm(Syn, F, Features), {!}.
oneaction(react, Syn, F, Features) --> reactterm(Syn, F, Features), {!}.
oneaction(release, Syn, F, Features) --> releaseterm(Syn, F, Features), {!}.
oneaction(signal, Syn, F, Features) --> signalterm(Syn, F, Features), {!}.
oneaction(substitute, Syn, F, Features) --> substituteterm(Syn, F, Features), {!}.
oneaction(transcribe, Syn, F, Features) --> transcribeterm(Syn, F, Features), {!}.
oneaction(promote, Syn, F, Features) --> promoteterm(Syn, F, Features), {!}.
oneaction(generate, Syn, F, Features) --> generateterm(Syn, F, Features), {!}.
oneaction(cause, Syn, F, Features) --> causeterm(Syn, F, Features), {!}.

action(activate, Syn, F, Features) --> activateterm(Syn, A1, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(attach, Syn, F, Features) --> attachterm(Syn, A1, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(breakbond, Syn, F, Features) --> breakbondterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(createbond, Syn, F, Features) --> createbondterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(inactivate, Syn, F, Features) --> inactivateterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(react, Syn, F, Features) --> reactterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(release, Syn, F, Features) --> releaseterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(signal, Syn, F, Features) --> signalterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(substitute, Syn, F, Features) --> substituteterm(Syn, F, Features),
    moreaction(Conj, Args),
    {Conj = [], F = A1;
    Conj\=[], mergemods([[action, A1]], Args, Actions),
    frame(F1, relation, Conj, Actions), F = [F1]}.

action(transcribe, Syn, F, Features) --> transcribeterm(Syn, F, Features),

```



```

        moreaction(Conj,Args),
        {Conj = [], F = A1;
        Conj\=[], mergemods([[action,A1]],Args,Actions),
        frame(F1,relation, Conj,Actions), F = [F1]}.
action(promote,Syn,F,Features) --> promoteterm(Syn,F,Features),
        moreaction(Conj,Args),
        {Conj = [], F = A1;
        Conj\=[], mergemods([[action,A1]],Args,Actions),
        frame(F1,relation, Conj,Actions), F = [F1]}.
action(generate,Syn,F,Features) --> generateterm(Syn,F,Features),
        moreaction(Conj,Args),
        {Conj = [], F = A1;
        Conj\=[], mergemods([[action,A1]],Args,Actions),
        frame(F1,relation, Conj,Actions), F = [F1]}.
action(cause,Syn,F,Features) --> causeterm(Syn,F,Features),
        moreaction(Conj,Args),
        {Conj = [], F = A1;
        Conj\=[], mergemods([[action,A1]],Args,Actions),
        frame(F1,relation, Conj,Actions), F = [F1]}.

% binds, phosphorylates and activates
moreaction(Conj,Args) --> sem_conjrest(Conj1),
        oneaction(Sem,Syn,A,Features),
        moreaction(Conj2,Alist),
        {Conj2 = [], Alist=[], Conj=Conj1, Args = [[action,A1]];
        Conj2 \= [], Conj = Conj2,
        addmod([action,A],Alist,Args) }.
moreaction([],[],S,S).

passiveconnect(Sem,[ven],Target,Features) -->
        sem_beterm(_),
        connectact(Sem,[ven],Target,Features).

processpatt(A) --> disease(A).
processpatt(A) --> process(A).

...
optbyorprepagent(first,A) --> byagent(A).
optbyorprepagent(second,A) --> prepagent(A).
optbyorprepagent(first,A) --> [], {A = x}.

byorprepagent(first,A) --> byagent(A).
byorprepagent(second,A) --> prepagent(A).

optbyagent(A) --> byagent(A).
optbyagent(A) --> [], {A = [x]}.

byagent(A) --> [by],
        substances(A).
byagent(A) --> [by],
        nounactionpatt(A).
prepagent(A) --> withobject(A).
prepagent(A) --> toobject(A).
% prepagent(A) --> andobject(A).
prepagent(A) --> ofobject(A).

```

```

% optprepagent(A) --> byagent(A).
optprepagent(A) --> ofobject(A).
optprepagent(A) --> withobject(A).
optprepagent(A) --> toobject(A).
optprepagent(A) --> andobject(A).
optprepagent(A) --> [], {A= [x]}.

ofobject(A) --> [of],
                nounactionpatt(A).
ofobject(A) --> [of],
                substances(A).
ofobject(A) --> [of],
                actionof(A).
ofobject1(A) --> [of], substance(A). % to parse Binding of Fyn and Bad.
optofobject(A) --> ofobject(A).
optofobject([x]) --> [].

processobject(A) --> process(A). % can be expanded to nounactpatt, etc.

% optwithobject(A) --> withobject(A).
% optwithobject(A) --> [], {A = [x]}.
withobject(A) --> [with], substances(A).
toobject(A) --> [to], substances(A).
andobject(A) --> [and], substances(A).
prepobject(A) --> [to], substances(A).
prepobject(A) --> [with], substances(A).

optbyarg(A) --> [by],
                actionarg(A).
optbyarg(A) --> substances(A).
optbyarg(A) --> [], {A = ['substance unknown']}.

prepop --> [to].
prepop --> [with].
prepop --> [by].
prepop --> [of].
prepop --> [].

% toopt
toopt --> [to].
toopt --> [].
% withopt
withopt --> [with].
withopt --> [].

optdash --> ['-'].
optdash --> [ ].
optof --> [of].
optof --> [ ].
/* optactionarg(A) --> actionarg(A).
optactionarg([]) --> []. */

optactionarg(A) -->
                actionarg(A).

```

```

% there is no further argument
optactionarg(A) -->
    [],
    {A = [] }.

% substances(F) --> substance(F).
% substances(F) --> substance(P1),
%     moresubstances(Conj,Plist),
%     { Conj = [], Plist = [], F = P1 ;
%     Conj \= [],
%     mergemods(P1,Plist,Args),
%     frame(F,relation,Conj,Args)
%     }.
% substances(F) --> substanceswithmods(F).
% substances(A) -->
%     proteins(A).
% subswithmods.txt

% substances is saved in a symbol table (st);
% check for success/failure 1st
% Case where substances is in st and has been successful
substances(Fmt) --> checkst(substances,_,s,Fmt).
% Case where substance is in st as a failure.
substances(_) --> checkst(substances,_,f,_), {!, fail}.

substances(F) -->
    snoop(S0,S0),
    { \+ checkst(substances,1,s,_,S0,_)},
    lmods(Lmods), % left modifiers
    (severalsubstances([relation,Conj,First|Rest]), % conjoined substances
    rmods(Rmods), % right modifiers
% create list of lists containing distributed mods. of substances
    { distributesubs(Dist,[First|Rest],Lmods,Rmods),
% check Lmods - "no" F1 or F2 should be changed to no F1 and no F2
    fixconj(Lmods,[rel,Conj],[rel,C2]),
    %splice([Conj,Dist],F)
    frame(F,relation,C2,Dist));
% substances and modifiers without conjunction
    substance(D1),
    rmods(Rmods),
    {D1 = [Type1, Substance1|ModsD1],
    delete(ModsD1, [], ModsD2),
    append([Lmods,Rmods],ModsD2,Allmods1),
    delete(Allmods1, [], Allmods2),
    frame(F,Type1,Substance1,Allmods2)}),
    snoop(S,S),
    {addst(substances,i,s,F,S0,S)}.

/* substances(F) --> snoop(S0,S0),
    {\+ checkst(substances,3 ,s,_,S0,_)},
    complex(F),
    {addst(substances,3,s,F,S0,S)}.
*/
% no more substances- save failure
substances(_) --> addst(substances,0,f,_), {!, fail}.

```

```

severalsubstances(F) --> substance(P1),
    moresubstances(Conj,Plist),
    { Conj = [], Plist = [], F = P1 ;
      Conj \= [],
      addmod(P1,Plist,Args),
      frame(F,relation,Conj,Args)
    }.

% ' X, Y, and Z'
moresubstances(Conj,Args) --> sem_conjrest(Conj1),
    substance(P1),
    moresubstances(Conj2,Plist),
    { Conj2 = [], Plist = [], Conj = Conj1, Args = [P1];
      Conj2 \= [] ,Conj2\= /, Conj = Conj2,
      addmod(P1,Plist,Args)
    }.

% to allow for substances with modifiers
moresubstances(Conj1,Args) --> sem_conjrest(Conj1),
    substances(Args),{!}.

moresubstances([],[]) --> []. % no conjunction

% distributesubs
% distributes left mods and right mods over list of findings creating
% list of lists of findings with mods
distributesubs([],[],_,_) :- !.
distributesubs(Dist,[D1|Tail],Lmods,Rmods) :-
    distributesubs(Dist2,Tail,Lmods,Rmods), %distributed for remainder
    D1 = [Type1, Substancel|ModsD1],
    append([Lmods,Rmods],ModsD1,Allmods1),
    delete(Allmods1,[],Allmods2),
    frame(D,Type1,Substancel,Allmods2),
    append([D],Dist2,Dist). % Combine findings to get list of findings

lmods(A) --> stateterm(F),
    {frame(A, state, F, [])}.
lmods([]) --> sem_measure(_).
lmods([]) --> [].
rmods([]) --> [].
stateterm(F) --> acclex(state, F).
% for past participle of createbond and breakbond actions, the target
% is the word. ex.: phosphorylated, dephosphorylated, methylated
stateterm(F) -->
    snoop(S0,S0), % get the initial string
    createbondterm([ven],_,_),
    {S0 = [F|_]}. %get the first word of the string
stateterm(F) -->
    snoop(S0,S0), % get the initial string
    breakbondterm([ven],_,_),
    {S0 = [F|_]}. %get the first word of the string

% may have to add attachterm for 'bound'

```

```
% Taken from MedLEE grammar to handle '3 cm'
sem_measure(M) -->
```

```
    sem_premeasure,
    sem_quantityterm(N),
    optdash,
    sem_measureterm(Unit),
    { frame(M,measure,[N,Unit],[]) }.
```

```
% complex predicates added November 8, 1999
```

```
% CrkL-C3G complex
```

```
% ras: raf-1 association
```

```
% ras: raf-1 complexes
```

```
% shc-grb2-sos
```

```
% TCR/CD3 complex
```

```
% p/CAF-p/CIP-CBP/p300-SRC-1 complex
```

```
% Ras:Raf-1 complexes
```

```
complex(C) --> proteins(P),
    { P = [A,B|_], A \= [], B \= [] },
    optcomplexword,
    { frame(C, complex,[P],[]) }.
```

```
% a complex of NFAT4 with calcineurin
```

```
complex(C) --> complexword,
    complexarg(A),
    { frame(C, complex,[A],[]) }.
```

```
complexarg(A) --> [of], proteins(A).
```

```
complexarg(A) --> [between], proteins(A).
```

```
% a complex between MyD88, IRAK-2, and the IL-1Rs
```

```
complexarg(A) --> action(contain), proteins(A).
```

```
% Complexes containing BOB.1/OBF.1 and Oct proteins
```

```
proteins(P) --> protein(A),
    moreproteins(P1),
    { (A\=[]; append([A],P1,P)) }.
```

```
moreproteins(A) --> proteinconnector,
    proteins(A).
```

```
moreproteins([]) --> [].
```

```
proteinconnector --> ['- '].
```

```
proteinconnector --> ['/'].
```

```
proteinconnector --> [': '].
```

```
% connector --> [', ']. taken out not to conflict with relation in
```

```
% connector --> [and].
```

moresubstances

```
proteinconnector(C) --> [with].
```

```
optconnector --> proteinconnector.
```

```
optconnector --> [].
```

```
complexword --> [complex].
```

```
complexword --> [complexes].
```

```
complexword --> ['signaling complexes'].
```

```
optcomplexword --> complexword.
```

```
optcomplexword --> [].
```

```
substance(A) --> protein(A).
```

```

substance(A) --> cell(A).
substance(A) --> species(A).
substance(A) --> structure(A).
substance(A) --> domain(A).
substance(A) --> gene(A).
substance(A) --> geneorprotein(A).
substance(A) --> aminoacid(A).
substance(A) --> smallmolecule(A).
substance(A) --> matter(A).
substance(A) --> proteinsite(A).
substance(A) --> disease(A).      % this will be modified later
substance(A) --> complex(A).

protein(A) -->
    proteinterm(P),
    {frame(A,protein,P,[])} .

complex(A) -->
    complexterm(P),
    {frame(A,complex,P,[])} .

cell(A) -->
    cellterm(P),
    {frame(A,cell,P,[])} .

species(A) -->
    specieterm(P),
    {frame(A,species,P,[])} .

structure(A) -->
    structureterm(P),
    {frame(A,structure,P,[])} .

domain(A) -->
    domainterm(P),
    {frame(A,domain,P,[])} .

gene(A) -->
    geneterm(P),
    {frame(A,gene,P,[])} .

geneorprotein(A) -->
    gpeterm(P),
    [X],
    {(X = gene, frame(A, gene, P, []);
      X = protein, frame(A, protein, P, []);
      X\= gene, X \= protein, frame(A, geneorprotein, P, []))} .

aminoacid(A) -->
    aminoacidterm(P),
    {frame(A,aminoacid,P,[])} .

smallmolecule(A) -->
    smallmoleculeterm(P),
    {frame(A,'small molecule',P,[])} .

matter(A) -->

```

```

matterterm(P),
{frame(A, substance, P, [])}.

proteinsite(A) -->
proteinsiteterm(P),
{frame(A, 'protein site', P, [])}.

disease(A) -->
diseaseterm(P),
{frame(A, disease, P, [])}.

process(A) -->
processterm(Syn, F, Features),
{frame(A, process, F, [])}.

process(A) -->
processterm(P),
{frame(A, process, P, [])}.

% terminals
proteinterm(F)      --> acclex(protein, F).
complexterm(F)      --> acclex(complex, F).
cellterm(F)         --> acclex(cell, F).
speciesterm(F)      --> acclex(species, F).
structureterm(F)    --> acclex(structure, F).
domainterm(F)       --> acclex(domain, F).
geneterm(F)         --> acclex(gene, F).
gpsterm(F)          --> acclex(gp, F).
aminoacidterm(F)    --> acclex(aminoacid, F).
smallmoleculeterm(F) --> acclex(smallmolecule, F).
matterterm(F)       --> acclex(substance, F).
proteinsiteterm(F)  --> acclex(proteinsite, F).
diseaseterm(F)      --> acclex(disease, F).
processterm(F)      --> acclex(process, F).

% action(activate, Syn, F, Features) --> activateterm(Syn, F, Features).

activateterm(Syn, F, Features) --> acclexss(activate, Syn, F, Features).
attachterm(Syn, F, Features)   --> acclexss(attach, Syn, F, Features).
breakbondterm(Syn, F, Features) --> acclexss(breakbond, Syn, F, Features).
createbondterm(Syn, F, Features) --> acclexss(createbond, Syn, F, Features).
inactivateterm(Syn, F, Features) --> acclexss(inactivate, Syn, F, Features).
reactterm(Syn, F, Features)     --> acclexss(react, Syn, F, Features).
releaseterm(Syn, F, Features)   --> acclexss(release, Syn, F, Features).
signalterm(Syn, F, Features)    --> acclexss(signal, Syn, F, Features).
substituteterm(Syn, F, Features) --> acclexss(substitute, Syn, F, Features).
transcribeterm(Syn, F, Features) --> acclexss(transcribe, Syn, F, Features).
promoteterm(Syn, F, Features)   --> acclexss(promote, Syn, F, Features).
processterm(Syn, F, Features)   --> acclexss(process, Syn, F, Features).
generateterm(Syn, F, Features)  --> acclexss(generate, Syn, F, Features).
causeterm(Syn, F, Features)     --> acclexss(cause, Syn, F, Features).

% Semlist contains a phrase which is an action
actionchk(Semlist) :-
    intersect(Semlist, [attach, cause, createbond, breakbond, activate,
        inactivate, substitute, transcribe, express, promote, signal]).

% Semlist contains a phrase which is a connector action

```

```

connectchk(Semlist) :-
    intersect(Semlist, [cause, activate, inactivate, substitute,
                        promote, signal]).

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                               Genome sectionc: ends here                               %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% relations are connected by conjunctions, or
% certain 'conn' prepositions.
% Taken from MedLEE grammar to handle connectives that are conjunctions
% Ex: "severe markings, possibly from tuberculosis"
sem_relation(F, []) --> % relation and modifiers
    sem_commapunc,
    sem_certainty([], C, rel),
    preterm(P, conn),
    {frame(F, rel, P, C)}.
    %splice([[rel, P], C], R).

% Ex: "markings, swelling", "markings and swelling"
sem_relation(R, []) --> sem_conjrel(R),
    sem_commapunc.
% "density may represent known tumor"

% "markings, and swelling"
sem_conjrel(F) -->
    sem_commapunc,
    sem_conjterm(Conj),
    {frame(F, rel, Conj, [])}.

sem_conjrest(Conj) --> % restricted conj, has not sem_relation_showopt
    sem_commapunc,
    sem_conjterm(Conj).
% "markings, swelling"
sem_conjrest(' ', ' ') -->
    snoop(S0, S0),
    sem_commapunc,
    snoop(S, S),
    {S0 \= S}.
% Treatment of Verbs from MedLEE's Grammar
% form of "be"
sem_auxverb(B) --> sem_beterm(B).
% form of "do"
sem_auxverb(B) --> sem_doterm(B).
% form of "have"
sem_auxverb(B) --> sem_haveterm(B).

sem_recrel --> preterm(in, _).
sem_recrel --> preterm(to, _).
% "is not"
sem_auxrel(V) --> sem_auxverb(_),
    sem_negterm(V).
sem_auxrel(V) --> sem_auxverb(V).
% left modifiers of findings include negation, quantity, certainty, degree, and
% change type modifiers

```



```

sem_integer(W) --> [W], {integer(W)}.
sem_integer(W) --> integerterm(W).
sem_timeunit(T) --> sem_timeunitterm(T).

% From MedLEE grammar - "lasting 2 days", "for 2 days", "times 2 days"
sem_duration(F) -->
    sem_durpreps,
    sem_premeasure, %about
    sem_timemeasure(T),
    sem_durationmod, % opt. - "in duration"
    {frame(F,duration,[T],[])}.
sem_duration([],S,S).

sem_durpreps --> [times].
sem_durpreps -->
    preterm(for,_).
sem_durpreps --> [lasting,for].
sem_durpreps --> [lasting].
sem_durpreps --> [lasted,for].
sem_durpreps --> [lasted].
sem_durationmod -->
    sem_aposts, %opt. - "'s"
    [duration].
sem_durationmod --> [in], [duration].
sem_durationmod --> [].
sem_aposts --> ['''], [s].
sem_apost --> [].

% sem_frequency taken From MedLEE's grammar
% "two times", "times two", "two times a/per week", "two times daily"
sem_frequency(F) -->
    sem_freqterm(F1), % "once"
    sem_freqterm(F2), % "a day"
    {frame(M,unitval,[F1,F2],[])},
    frame(F,frequency,[M],[])}.

sem_frequency(F) -->
    sem_freqterm(M), % "qid", "daily"
    {frame(F,frequency,M,[])}.

% "2 times",
sem_frequency(F) -->
    sem_premeasure,
    sem_quantityterm(M),
    sem_times,
    {frame(F,frequency,[M],[])}.

% "times 2"
sem_frequency(Q) -->
    sem_times,
    sem_quantityterm(Q1),
    {frame(Q,frequency,Q1,[])}.
sem_frequency(F) -->
    [q], sem_quantityterm(Q),
    sem_timeunit(T),
    {frame(F,frequency,[unitval,[Q,T]],[])}.

```

```

sem_frequency(F) --> sem_eachevery,
                    sem_quantityterm(Q),
                    sem_timeunit(T),
                    {frame(F,frequency,[unitval,[Q,T,every]],[])}).
sem_frequency(Q) --> % "second"
                    sem_ordinal(O),
                    sem_timeopt,
                    {frame(Q,frequency,O,[])}).
sem_frequency([],S,S).
sem_timeopt --> [time].
sem_timeopt --> [].
sem_eachevery --> [each].
sem_eachevery --> [every].
sem_times-->[times].
sem_times-->[x].

% Taken from MedLEE's grammar
negation modifier - "no" as in "no cardiomegaly"
sem_negation(F) -->
                    sem_negterm(N),
                    {frame(F,neg,N,[])}).
% negation not present
sem_negation([],S0,S0).

% Taken from MedLEE's grammar
% quantity modifier - "two" as in "two masses"
sem_quantity(F) -->
                    snoop(S0,S0),
                    { \+ checkst(sem_dates,1,s,_,S0,_) }, % not a legitimate date
                    sem_quantityterm(Q),
                    sem_quantityrmod(_), % "2 or 3", "2 to 3"
                    {\+ next_wordunit(S0), % rule out '2 mm'
                     frame(F,quantity,Q,[])}).
sem_quantity([],S0,S0).

sem_commapunc([' '|S],S).
sem_commapunc(S,S).
sem_conjterm(C) --> acclex(conj,C).
sem_doterm(D) --> acclex(vdo,D).
sem_endmark(['|S],S).
sem_endmark([';|S],S).
sem_freqterm(F) --> acclex(freq,F).
sem_haveterm(H) --> acclex(vhave,H).
integerterm(I) --> acclex(integer,I).
sem_measureterm(M) --> acclex(unit,M).
sem_medterm(M) --> acclex(med,M).
sem_negterm(N) --> acclex(neg,N).
prepterm(P,C) --> acclex(p,[P,C]).
sem_timeunitterm(T) --> acclex(timeunit,T).

```

```

% lexog - adapted from MedLEE lexicon
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% CLOSED WORD CATEGORY LEXICON %%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% NEGATIONS %%%%%%%%%%
:-unknown(_, fail).
:-multifile(wdef/3).
wdef(cannot, neg, no).
wdef(neither, neg, no).
wdef(never, neg, no).
wdef(no, neg, no).
wdef(non, neg, no).
wdef(none, neg, no).
wdef(not, neg, no).
wdef(nothing, neg, no).
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% CONJUNCTIONS %%%%%%%%%%
wdef('&', conj, and).
wdef('/', conj, or).
wdef('-', grammar, '-').
wdef('+', conj, and).
wdef(although, conj, and).
wdef(and, conj, and).
wdef(as, conj, and).
wdef(because, conj, and).
wdef(but, conj, and).
wdef(',', conj, ',').
wdef(except, conj, no).
%wdef(if, grammar, if).
wdef(minus, conj, no).
wdef(nor, conj, no).
wdef(or, conj, or).
wdef(that, grammar, that).
wdef(though, conj, and).
wdef(thru, conj, and).
wdef(verses, conj, or).
wdef(versus, conj, or).
wdef(vs, conj, or).
wdef(when, grammar, when).
wdef(where, grammar, where).
wdef(whereas, conj, and).
wdef(which, grammar, which).
wdef(while, conj, and).
wdef(who, grammar, who).
wdef(yet, conj, and).
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% PREPOSITIONS %%%%%%%%%%
wdef(above, ploc, above).
wdef(about, p, [approximately, nconn]).
wdef(about, ploc, about).
wdef(across, ploc, across).
wdef(abutting, ploc, near).
wdef(accompanies, p, [with, conn]).
wdef(accompanying, p, [with, conn]).
wdef(adjacent, ploc, adjacent).
wdef(adjacent, region, adjacent).
wdef(after, p, [after, conn]).
wdef(after, tprep, after).
wdef(along, p, [on, nconn]).
wdef(approximately, p, [approximately, nconn]).
wdef(around, p, [approximately, nconn]).

```

```

wdef (at,p,[at,nconn]) .
wdef (atop,p,[on,nconn]) .
wdef (before,ploc,before) .
wdef (before,tprep,before) .
wdef (behind,ploc,behind) .
wdef (below,ploc,below) .
wdef (between,ploc,between) .
wdef (beyond,ploc,beyond) .
wdef (by,ploc,near) .
wdef (despite,p,[with,conn]) .
wdef (during,p,[during,conn]) .
wdef (during,tprep,during) .
wdef (encasing,ploc,encasing) .
wdef (extending,p,[in,nconn]) .
wdef (following,p,[after,conn]) .
wdef (following,tprep,after) .
wdef (for,p,[for,nconn]) .
wdef (from,p,[from,conn]) .
wdef (in,p,[in,nconn]) .
wdef (including,p,[with,conn]) .
wdef (into,p,[in,nconn]) .
wdef (involving,p,[of,nconn]) .
wdef (next,tprep,next) .
wdef (occupying,p,[in,nconn]) .
wdef (on,p,[on,nconn]) .
wdef (of,p,[of,nconn]) .
wdef (over,ploc,over) .
wdef (overlie,ploc,over) .
wdef (overlaid,ploc,over) .
wdef (overlies,ploc,over) .
wdef (overlying,ploc,over) .
wdef (prior,tprep,before) .
wdef (near,ploc,near) .
wdef (radiating,ploc,radiating) .
wdef (regarding,p,[about,nconn]) .
wdef (roughly,grammar,roughly) .      % 'roughly 6 mm'
wdef (since,p,[since,conn]) .
wdef (since,status,subsequent) .
wdef (through,p,[in,nconn]) .
wdef (throughout,p,[in,nconn]) .
wdef (to,p,[to,nconn]) .
wdef (toward,p,[to,nconn]) .
wdef (towards,p,[during,conn]) .
wdef (under,ploc,below) .
wdef (underneath,ploc,below) .
wdef (until,tprep,until) .
wdef (up,grammar,up) .
wdef (upon,p,[on,nconn]) .
wdef (via,p,[with,conn]) .
wdef (with,p,[with,conn]) .
wdef (within,p,[in,conn]) .
wdef (without,p,[no,conn]) .
%wdef (without,neg,no) .

```

```

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% UNITS OF MEASURE %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef ('%',unit,percent) .

```

```

wdef(cc,unit,cc).
wdef(centimeter,unit,cm).
wdef(centimeters,unit,cm).
wdef(cm,unit,cm).
wdef(degrees,unit,degree).
wdef(gm,unit,gram).
wdef(gms,unit,gram).
wdef(gram,unit,gram).
wdef(grams,unit,gram).
wdef(kg,unit,kilogram).
wdef(kilo,unit,kilogram).
wdef(kilogram,unit,kilogram).
wdef(kilograms,unit,kilograms).
wdef(liter,unit,liter).
wdef(liters,unit,liter).
wdef(microgram,unit,microgram).
wdef(micrograms,unit,microgram).
wdef(milliliter,unit,ml).
wdef(milliliters,unit,ml).
wdef(milligram,unit,mg).
wdef(milligrams,unit,mg).
wdef(millisecond,unit,millisecond).
wdef(millivolts,unit,millivolt).
wdef(ml,unit,ml).
wdef(millimeter,unit,mm).
wdef(millimeters,unit,mm).
wdef(mm,unit,mm).
wdef(ozs,unit,ounce).
wdef(percent,unit,percent).
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% NUMBERS %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
wdef(half,integer,'one half').
wdef(semi,quantity,semi).
wdef(ii,integer,2).
wdef(iii,integer,3).
wdef(vi,integer,4).
wdef(v,integer,5).
wdef(vi,integer,6).
wdef(vii,integer,7).
wdef(viii,integer,8).
wdef(ix,integer,9).
wdef(xii,integer,12).
wdef(xiii,integer,13).
wdef(one,integer,1).
wdef(two,integer,2).
wdef(double,quantity,double).
wdef(three,integer,3).
wdef(four,integer,4).
wdef(quadruple,quantity,quadruple).
wdef(five,integer,5).
wdef(six,integer,6).
wdef(sixty,integer,60).
wdef(seven,integer,7).
wdef(eight,integer,8).
wdef(nine,integer,9).
wdef(ten,integer,10).
wdef(eleven,integer,11).
wdef(twelve,integer,12).

```

```

wdef(thirteen, integer, 13) .
wdef(fourteen, integer, 14) .
wdef(fifteen, integer, 15) .
wdef(sixteen, integer, 16) .
wdef(seventeen, integer, 17) .
wdef(eighteen, integer, 18) .
wdef(nineteen, integer, 19) .
wdef(twenty, integer, 20) .
wdef(thirty, integer, 30) .
wdef(forty, integer, 40) .
wdef(fifty, integer, 50) .
wdef(sixty, integer, 60) .
wdef(seventy, integer, 70) .
wdef(eighty, integer, 80) .
wdef(ninety, integer, 90) .
wdef(hundred, integer, 100) .
wdef(thousand, integer, 1000) .
wdef(million, integer, 1000000) .
wdef(billion, integer, billion) .
wdef(zero, integer, 0) .
wdef(first, ointeger, 1) .
wdef(second, ointeger, 2) .
wdef(third, ointeger, 3) .
wdef(fourth, ointeger, 4) .
wdef(fifth, ointeger, 5) .
wdef(sixth, ointeger, 6) .
wdef(seventh, ointeger, 7) .
wdef(eighth, ointeger, 8) .
wdef(ninth, ointeger, 9) .
wdef(tenth, ointeger, 10) .
wdef(eleventh, ointeger, 11) .
wdef(twelfth, ointeger, 12) .
wdef(thirteenth, ointeger, 13) .
wdef(fourteenth, ointeger, 14) .
wdef(fifteenth, ointeger, 15) .
wdef(sixteenth, ointeger, 16) .
wdef(seventeenth, ointeger, 17) .
wdef(eighteenth, ointeger, 18) .
wdef(ninteenth, ointeger, 19) .
wdef(triple, quantity, triple) .
wdef(twentieth, ointeger, 20) .
wdef(thirtieth, ointeger, 30) .
wdef(single, quantity, 1) .
wdef(solitary, quantity, 1) .

```

```

wdef(frequency, grammar, frequency) . */
wdef('.', grammar, '.') .
wdef(';', grammar, ';') .
wdef('/', grammar, '/') .
wdef(':', grammar, ':') .
wdef('?', certainty, 'moderate certainty') .
wdef('+', certainty, 'high certainty') .
wdef(''''', grammar, ''''') .

```

```

***** FREQUENCIES *****
wdef(once, freq, 1) .
wdef(times, grammar, x) .

```

WO 00/63687

PCT/US00/10302

wdef (twice, freq, 2) .

```

% lexicon with lex0g containing common English words adapted from lex0 of
MedLEE%
% lex1g from lex1 of MedLEE
% August 23, 1999
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%                               CAROL FRIEDMAN                               %
%                               QUEENS COLLEGE, COLUMBIA UNIVERSITY           %
%
%                               Version 3.0  4-01-00                         %
%                               Version 2.0  1-31-96                         %
%                               Version 1.0  1-5-92                         %
%
%                               SEMANTIC LEXICON FOR CLINICAL TEXT           %
%
% The lexicon consists of several files:
%   lex0g.pl: single word closed classes
%   lex1g.pl: single word - general modifier type words:
%               %
%   wdef(category,target).
%       word - is the name of the word being categorized;
%       category - is the semantic category for the word
%       target - is the canonical/standard form for the word
%               words which are synonyms should be assigned the same
%               canonical form.
%   multi-word phrases are categorized as follows:
%   phrase(word,category,phrase,target).
%
% Semantic Categories:
%
%       certainty "possible"
%               canonical values limited to: moderate - for possible
%               high - for high possible
%               low - for low possible
%
%       conj - relational operators "and", "or" , which connect one finding
%               to another finding
%       neg - negation "no", "not"
%       quant - for quantitative information "many"
%
% :-unknown(_,fail).
% :-ensure_loaded([nsphrase,lex0g,lex1g,lexsemact,lexsyn,lexsub]).

```



```
% definitions kept from MedLEE lexicon - lex1.pl
wdef(be,vbe,'high certainty').
wdef(been,vbe,'high certainty').
wdef(being,vbe,'high certainty').
wdef(was,vbe,'high certainty').
wdef(is,vbe,'high certainty').
wdef(were,vbe,'high certainty').
/*
wdef(became,vcertainty,'high certainty').
wdef(become,vcertainty,'high certainty').
wdef(becomes,vcertainty,'high certainty').
wdef(becoming,vcertainty,'high certainty').
                                put in action lexicon
wdef(changed,change,change).
wdef(changes,change,change).
wdef(changing,change,change).
wdef(necessarily,certainty,'high certainty').
wdef(necessary,vrecommend,recommended).
wdef(necessitate,vstatus,need).
wdef(necessitated,vstatus,need).
wdef(necessitating,vstatus,need).
wdef(necessitates,vstatus,need).
wdef(need,vstatus,need).
wdef(needed,vstatus,need).
wdef(needing,vstatus,need).
wdef(needs,vstatus,need).
```

*/

```

% file ml_parser.pl
:- multifile(phrase/5).
:- multifile(wdef/3).
:- unknown(_, fail).
% Load in program components - library components are part of Prolog
:- ensure_loaded([library(basics), library(not), library(lists),
    library(readin), library(strings), library(ctypes), library(readconst),
    library(date), library(listparts), library(sets),
    radrec, radpardb, useful, util, tagging, lexicon, gengram])).

%:- initialization run.
%run :- on_exception(Error, processrun, stop(Error)).
runtime_entry(start) :- processrun.
runtime_entry(abort) :- halt.

% process report
processrun :- process, halt.

%stop(Error) :-
%   told,
%   write(user_error, 'Error: '), write(user_error, Error), halt.

% get user supplied parameters and process report
process :-
get_args(Mode, Infile, Outfile, Prb, Undefs, Protocol), !,
    (Examtype = []; % must have a domain
    process(Infile, Outfile, Prb, Undefs)).

% open Infile (text input) and process
process(Infile, Outfile, Prb, Undefs) :-
    see(Infile), seen, see(Infile),
    on_exception(Error,
        test_genome(Outfile, Prb, Undefs),
        app_err0(_, Outfile, Error)),
    closefiles(Outfile, Prb, Undefs).
process(_, Outfile, _, _) :-
    app_err(_, Outfile, 'Program failed').

app_err0(_, Output, Error) :-
    tell(Output),
    write('<error>'),
    write('Prolog Error occurred: '),
    app_err(_, Output, Error).
app_err1(_, Output, Error) :-
    tell(Output),
    write('<error>'),
    write('Error in input: '),
    app_err(_, Output, Error).
app_err(_, Output, Error) :-
    tell(Output),
    write(Error), write('</error>'), nl.

closefiles(Outfile, Errfile, Unfile) :-
    tell(Outfile), told,
    (Errfile = []; tell(Errfile), told),
    (Unfile = []; tell(Unfile), told).

```

```

% Argument options - get user defined arguments
% -p ProbFile (otherwise default is problem messages are not written to file)
% -i Infile (if input is supplied by file and not standard input
% -s Section (default is impression)
% -m Mode (default is relax; the three choices are strict, relax, skip)
% -o Outfile (if output should be file and not standard output)
% -? Provide list of default arguments
% -u Undefs (otherwise default is - undefined messages are not written
%      to a file)
get_args(Mode, Infile, Outfile, Prbfile, Undefs, Protocol) :-
    unix(args(Args)),
    (Args = [], !, writesyntax;
     Args = ['?'], !, writesyntax;
     Args = [X|Rest], !,
     set_args([X|Rest], Mode, Infile, Outfile, Prbfile, Undefs, Protocol)).

writesyntax :-
    write(user_error, 'geneparser [-m Mode]'),
    nl(user_error),
    write(user_error, '          [-t Outtype] [-p Probfile] [-u Undefs]'),
    nl(user_error),
    write(user_error, '          [-i Infile] [-o Outfile]'),
    nl(user_error).

```

```
% nsphrase.pl - contains words/phrases that are ignored  
nosem(both, [both]).  
nosem(however, [however]).  
nosem(selectively, [selectively]).  
nosem(specifically, [specifically]).  
nosem(the, [the]).  
nosem(a, [a]).
```

```

% file radpardb.pl
% June 25, 1999
% fail an unknown predicate
:-unknown(_,fail).
:- op(900, fy, [not,once]). % same priority and type as \+
:- op(700, xfx, [\=,~=]). % same priority and type as = or ==
:- dynamic(sentno/1).
% \sem\radpardb.pl
% parse_sentences(+Beg,-Fmt,-ParseErrors,-Undefineds,-Unsents,+Section,
%               +UserMode,+Examtype,Sentno,Outsno,IncSno)
%   Beg is list of sentences, Fmt is list of target forms,
%   ParseErrors are a list of sentences which could not parse,
%   Undefineds is a list of undefined words in sentence
%   Unsents is a list of sentence containing undefined words
%   Section is the section of the examination, UserMode is the
%   parsing mode specified by user,
%   Examtype is the domain (type of exam)
%   Sentno is the number of the starting sentence
%   Outsno is the last sentence number + 1
%   IncSno is the amount that the sentence number should be increased
%       (i.e. it is 1 when called by parse_sects and 0 when in
%       recovery mode)
%   Each sentence is parsed independently.
parse_sentences([],[],[],[],[],_,_,_,_,_) :- !. %no more sentences
parse_sentences(Beg,Fmtlist,Outfail,Outundefs,OutunSents,
                Section,UserMode,Examtype,_,_,IncSno) :-
    get_sentence(Beg,S,Rest), !,
    ( identifier(S), !, % ignore identifier sentences - parse remainder
      parse_sentences(Rest,Fmtlist,Outfail,Outundefs,OutunSents,
                      Section,UserMode,Examtype,_,_,IncSno), !,
      (outputform(htext), S \= ['.'], !, IncSno \= 0, %0 means in recovery
mode
        append([[sentence,S]],Fmtlist,Fmtlist);
        Fmtlist = Fmtlist
      )
    );
    % ( IncSno = 0, !; % on same sentence in recovery mode
    %   sentno(Sno), NewSentno is Sno + IncSno,
    %   retract(sentno(_)), assert(sentno(NewSentno))
    % ),

% IncSno = 1, write('***'), write_list(S,3,_), nl, !,
% IncSno = 0,

    preprocess(S,Bs,Undef,Semlist,strict), % bracket and check for undefineds

    parse_modes(S,Bs,Semlist,Fmtlist,Errors,Undef,Unsents,Section,Writefail,
                Examtype,UserMode,IncSno), % parse first sentence

    parse_sentences(Rest,Fmt2,Moreerrors,Moreundefs,MoreUnSents,
                    Section,UserMode,Examtype,_,_,IncSno), % parse remaining
    append(Errors,Moreerrors,Outfail), % Combine failures
    (outputform(htext),
      (Fmtlist \= [], IncSno \= 0,
        !, append([Fmtlist],Fmt2,Fmtlist); % add extra bracket for 1st
        Fmt2 = [], Fmtlist = Fmtlist, !
      )
    )

```

```

        ;
        append(Fmt1,Fmt2,Fmtlist)
    ),
        % Combine targets
    append(Unsents,MoreUnSents,OutunSents), % Combine sentences
    append(_UNDEF,Moreundefs,Outundefs)      % Combine undefined words
    ).

%parse_modes(+S,+Bs,+Semlist,-Fmt,-Failures,+_UNDEF,-Unsents,+Section,
% +WriteMessage,+Examtype,+Mode,+IncSno)
%   S is original sentence; Bs is sentence after lexical lookup
%   Semlist is list of semantic categories in sentence
%   Fmt is formatted output,
%   Failures is list of sentences/fragments which could not be parsed.
%  _UNDEF are words not in lexicon, Unsents are sentences containing
%       undefined words
%   Section is name of section being processed
%   WriteMessage is message returned from doresult (in case doresult fails)
%   Examtype is domain, Mode is user specified mode
%   IncSno is 0 if this is a fragment of a sentence that was already
%       parsed - but unsuccessfully; is 1 if this is a new sentence
% Best possible - try to get the most accurate parse possible trying
% all alternative strategies in turn if necessary
% All words in sentence are defined
parse_modes(S,Bs,Semlist,Fmt,Errors,[],[],Section,no,Examtype,Pmode,
    Inc) :-
    (Pmode = bpsseg, Pmodemod = mode2, !; %in recovery mode
    Pmode = bpsseg2, Pmodemod = mode2, !;
    Pmode = bpsseg3, Pmodemod = mode2, !;
    Pmode = bpskip, Pmodemod = mode4, !; %in recovery mode
    % in user specified parse mode - don't parse in mode 5 or keyword
    Pmode \= keyword, Pmode \= mode5,
    Pmodemod = model
    ),
    dosent(S,Bs,Semlist,Fmt1,Message,Section,_,Examtype,Pmodemod,_), !, %
strict first
    recovery(_,S,Bs,Semlist,Fmt2,Message,Errors,[],[],Section,
        Pmode,Examtype,_), % try alternative modes if neccy
    (outputform(htext), Inc \= 0, !, append([[sentence,S]],Fmt1,Fmt2), Fmt);
    append(Fmt1,Fmt2,Fmt)
    ).

% alternative strategies if have undefined words
parse_modes(S,Bs,Semlist,Fmt,Errors,_undef,Unsents,Section,no,Examtype,
    Pmode,Inc) :-
    _undef \= [],
    recovery(_,S,Bs,Semlist,Fmt1,yes,Errors,_undef,Unsents,Section,
        Pmode,Examtype,_), % try alternatives if have undefines
    (outputform(htext), Inc \= 0, !, append([[sentence,S]],Fmt1,Fmt);
    Fmt = Fmt1
    ).

% key word strategy is fastest but least reliable;
parse_modes(S,Bs,Semlist,Fmt,Errors,_undef,Unsents,Section,no,Examtype,
    Pmode,Inc) :-
    (Pmode = keyword; Pmode = mode5
    ; Pmode = mode5),
    recovery(5,S,S,Semlist,Fmt1,yes,Errors,_undef,Unsents,Section,Pmode,
        Examtype,_),
    (outputform(htext), Inc \= 0, !, append([[sentence,S]],Fmt1,Fmt);

```

```

    Fmt1 = Fmt
  ).
% Parsing/Recovery modes
% parse_modes(+Level,+S,+Bs,+Sem,-Fmt,+Failed,+Undef,+Unsents,+Section,
%             +Pmode,+Examtype,_)
%   Level is the recovery level of the predicate
%   S is the original sentence list
%   Bs is the
%   Sem is the list of semantic categories in the sentence
%   Fmt is the formatted output for the sentence
%   Failed is 'yes' if the parse was unsuccessful, and 'no' otherwise
%   Undef is a list of words in sentence which are undefined(not in lexicon)
%   Unsents are the lists of sentences/segments which could not be parsed.
%   Section is the section of the report
%   Pmode is the user specified parse mode
%   Examtype is the domain
% mode 1 is the strictest parsing mode - the parser succeeded for the complete
%       original sentence using the grammar; all words in original sentence
%       are defined in lexicon
% mode 1 - alternative not needed because parse succeeded
recovery(1,_,_,_,[],no,[],Undef,Unsents,_,_,_,_) :- !.
%       - no alternative strategy allowed in mode 1
%       in case where there are no undefineds, Noparse is S
recovery(1,S,_,_,[],yes,S,[],[],_,Pmode,_,_) :-
    Pmode = strict; Pmode = model, !.
%       in case there are undefineds, Unsents is S
recovery(1,S,_,_,[],yes,Noparse,Undef,Unsents,_,Pmode,_,_) :-
    (Pmode = strict; Pmode = 'model'),
    Undef \= [], Unsents = S, Noparse = [], !.
recovery(1,S,_,Semlist,[],yes,S,_,_,_,_,_) :-
% sentence contains no relev. information, don't try to recover
% \+ (subtype(finding,Semlist); subtype(time,Semlist)), !.
\+ actionchk(Semlist).      % april 23, restored
% mode 4 - skip undefined words and try to parse according to mode 1
recovery(4,S,_,_,Fmt,yes,Errors,Undef,[],Sect,Pmode,Examtype,_) :-
    Undef \= [],
    (Pmode = bp; Pmode = mode4;
    Pmode = bpseg; Pmode = bpskip; Pmode = mode4
    ),
    preprocess(S,Bs,_,Semlist,bpskip),
    dosent(S,Bs,Semlist,Fmt1,Message,Sect,_,Examtype,mode4,_,_),
    recovery(_,Bs,Bs,Semlist,Fmt2,Message,Errors,[],[],Sect,
    bpskip,Examtype,Sentno), % try alternatives if neccy
    append(Fmt1,Fmt2,Fmt).

% mode 3 - try longest parsed segment; partition rest of
% sentence using mode 5 for parse mode bp
recovery(3,S,Bs,_,_,Fmt,yes,Errors,Undef,Unsents,Sect,Pmode,Examtype,_) :-
% allowable modes for choosing longest segment
(Pmode = bp; Pmode = bpskip;
Pmode = skip; Pmode = mode3; Pmode = mode4;
Pmode = bpseg3; Pmode = bpseg
),
(Pmode = bpskip, Pmodemod = mode4_3;
Pmodemod = mode3
),
checkst(sem_pattern,_,s,Target,Bs,Rest), %check symbol table

```

```

%dooresult (Target, Fmt1, Examtype, Sect, Pmodemod, _),
  formatresult (Target, Pmodemod, Fmt1),
  (Pmode = mode3, Fmtlist = [], Errors = Rest;
  recovery(5, Rest, Rest, _, Fmtlist, yes, Errors, Undef, Unsents, Sect,
    Pmode, Examtype, _))
),
append(Fmt1, Fmtlist, Fmt).
% mode 2 segments sentence using word barrier methods. This mode is tried if
%   parse failed for original sentence/or there are undefined words
%   segment sentence using word barriers
recovery(2, S, _, _, Fmt, yes, Errors, Undef, Unsents, Sect, Pmode, Examtype, _) :-
  (Pmode = bp; Pmode = bpskip; Pmode = mode2; Pmode = skip;
  Pmode = mode2; Pmode = mode3; Pmode = mode4;
  Pmode = bpseg; Pmode = bpseg2;
  Pmode = bpseg3
  ),
  segmentandparse(S, Fmt, Errors, Unsents, Sect, Pmode, Examtype, _), !.
% mode 5 - try to partition sentences by findings
% when a finding in sentence is found, go left until first
%   modifier is found (if 2 findings are next to each other, 2nd one
%   is considered the finding and 1st is considered the modifier)
% Repeat searching for successive findings using this method
recovery(5, [], [], _, [], [], [], _, _, _, _) :- !.
recovery(5, S, Bs, _, Fmt, yes, Errors, Undef, Unsents, Sect,
  Pmode, Examtype, _) :-
  (Pmode = bp; Pmode = bpskip; Pmode = bpseg; Pmode = keymode;
  Pmode = mode5; Pmode = negmode
  ),
  preprocess(S, Bs1, _, _, bpskip), % skip undefined words
  actionfindingseg(Bs1, Fseg, Before), !, % get segment containing finding
  (Fseg = [], Errors = S, !; % no finding to segment
  %Before = [], Errors = Bs, Fmt1 = [], !; % this part was tried
  preprocess(Fseg, Bseg, _, Semlist, bpskip),
  dosent(Fseg, Bseg, Semlist, Fmt1, Message, Sect, _, Examtype,
    mode5, _) % try to parse finding segment
  ),
  (Before = [], Before1 = [], Message = yes, !; % no segmenting yet -
skip beg.
  Message = yes, Before1 = Before, !; %don't add '.'; have to skip
more
  append(Before, ['.'], Before1)
  ),
  ( Fseg = [], Fmt = [], !; % no finding left in sent. - don't recover
  recoverrest(Fseg, _, Before1, Fmt2, Message, Errors,
    Sect, Newmode, Examtype, _),
  % recover remainder
  append(Fmt1, Fmt2, Fmt)
  ).

% nothing could be recovered; all input -> Errors ; Format is []
recovery(_, Sents, _, _, [], yes, Sents, Undef, [], _, _, _).

% part of phrase was skipped, add period and treated skipped part as a
% sentence
% recoverrest(+Segment, +Semlist, +Before, -Fmt, +Message, -Failures, +Section,
%   +Mode, +Examtype, _)
% Segment is part of sentence with a finding

```



```

%      Semlist is a list of semantic categories for that sentence part
%      Before is the part of sentence before Segment
%      Fmt is the format for this segment
%      Message is 'no' if there is no segmantic information to be recovered
%      Message is 'yes' otherwise
%      Failures are lists of segment(s) that could not be parsed successfully
%      Section is section being processed, Mode is user specified parsing mode
%      Examtype is domain
recoverrest(,_,Before,[],no,Before1,_,_,_,_) :-
    (Before = [], Before1 = [], !; % nothing was skipped
    append(Before,['.'],Before1)
    ), !.
% nothing left to recover; write phrase that was skipped
recoverrest([],_,Before,[],yes,Before1,_,_,_,_) :-
    (Before = [], Before1 = [], !;
    append(Before,['.'],Before1)
    ), !.
% can recover partial parse
recoverrest(Bs,_,Before,Fmt,yes,Errors,Sect,Pmode,Examtype,_) :-
    checkst(sem_pattern,_,s,Target,Bs,Restseg), % recover from symbol tab.
    %doresult(Target,Fmt1,Examtype,Sect,mode5,_,
    formatresult(Target,mode5,Fmt1),
    recovery(5,Restseg,Rest,_,Fmt2,yes,Error2,
    [],[],Sect,Pmode,Examtype,_,
    append(Fmt1,Fmt2,Fmt),
    (Before = [], Errors = Error2, !; %nothing skipped to add '.' to
    append(Before,['.'],Error2),Errors)
    ).
% cannot recover partial parse - skip first element and retry
% if 1st element is a negation semantic type, skip 2nd element instead
%      Handles case where 1st element is a negation,certainty or status
%      add 2nd element to unparsed sentences list (enlcosed in angle brackets).
recoverrest([X,Y|Restseg],_,Before1,Fmt,yes,Errors,
    Sect,Pmode,Examtype,_) :-
    foundword(X,Sem1,Tar),
    ( member(Sem1,[neg,certainty,vcertainty,vconn,status,vstatus]);
    Sem1 = p, Tar = [_,conn]
    ),
    ... % (Mod = neg; Mod = certainty; Mod = status; Mod = vcertainty), % leave
this mod in
    preprocess([X|Restseg],Fseg0,_,_,bpskip), % skip undefined words
    findingseg(Fseg0,Fseg,Before2), !, % get finding seg
    (Fseg = [], Errors = [X,Y|Restseg], Fmt = []; % no finding
    preprocess(Fseg,Bseg,_,Restsem,bpskip), % skip undefined words
    dosent(Fseg,Bseg,Restsem,Fmt1,Message,Sect,_,Examtype,
    mode5,_, % try to parse finding segment
    recoverrest(Fseg,_,[Y|Before2],Fmt2,Message,Error2,
    Sect,negmode,Examtype,_, % recover remainder
    (Before1 = [], Errors = Error2, !;
    append(Before1,['.'],Error2),Errors)
    ),
    append(Fmt1,Fmt2,Fmt)
    ).
% skip 1st element; enclose it in brackets
recoverrest([X|Restseg],_,Before1,Fmt,yes,Errors,
    Sect,Pmode,Examtype,_) :-
    preprocess(Restseg,Fseg0,_,_,bpskip),

```

```

        findingseg(Fseg0,Fseg,Before2), !, % get finding seg
        append(Before1,[X|Before2],Before),
        (Fseg = [], Errors = [X|Restseg], Fmt = []; % no finding
        preprocess(Fseg,Bseg,_,Restsem,bpskip),
        dosent(Fseg,Bseg,Restsem,Fmt1,Message,Sect,_,Examtype,
            mode5,_), % try to parse finding segment
        recoverrest(Fseg,_,Before,Fmt2,Message,Errors,
            Sect,Newmode,Examtype,_), % recover remainder
        append(Fmt1,Fmt2,Fmt)
    ).

% no semantic information left; return Errors
recoverrest([X|Restseg],[],Before1,Fmt,yes,[X|Restseg],
    Sect,Pmode,Examtype,_).

%dosent(+S,+Bs,+Semlist,-Fmtlist,+Message,+Section,+WriteMessage,+Examtype,
%      +Mode)
%      S is original list of words in sentence; Bs is list after lexical lookup
%      Semlist is list of semantic categories corresponding to Bs
%      Fmtlist is list of target forms for sentence
%      Message is 'yes' if the output from parser signals a failure,
%      and 'no' otherwise
%      Section is section of examination being processed
%      WriteMessage signals whether an error occurred in generating target form
%      Examtype is the domain, and Mode is the user specified mode of parsing
% Parse sentence and returns target in nested format
% Handles case where sentence should be skipped because info is about
% family member or peripheral to patient
dosent(S,_,Semlist,[],Error,_,_,_,_) :-
    skipsentence(S,Semlist,Error), !.
dosent(S,Bs,Semlist,Fmtlist,Errormsg,Section,Writefail,Examtype,Mode,_) :-
    attemptparse(P,Bs,sentence,Semlist,Section,Atotal),
    ( P = [failure], Errormsg = yes, Writefail = no, ! % parse failure
    ;
    P = [], Errormsg = no, Writefail = no, Fmtlist = [], ! % empty target
    ;
    %doresult(P,Fmtlist,Examtype,Section,Mode,_),
    formatresult(P,Mode,Fmtlist),
    Errormsg = no, Writefail = no, !
    ;
    Errormsg = yes, Writefail = yes, !
    ).

%parse_sentences(Beg,Beg,[],[],_,_,_) :- !.

% attemptparse(-P,+Bs,+Structure,+Semlist,-Ftype,-Total)
%      P is output from parser
%      Bs is list of words in sentence after lexical lookup
%      Structure is name of structure to be parsed
%      Semlist is list of semantic categories corresponding to elements in Bs
%      Total is number of times parser reached sem_sent in grammar;
%      where sem_sent is highest level predicate in grammar
% don't parse if sentence consists of only '.' or ';'
attemptparse([],Bs,_,_,_,_) :-
    Bs = ['.']; Bs = [';'].

% if a template exists for whole sentence, get parse from it

```

```

attemptparse(P,Bs,sentence,_,_,_) :-
    Bs = [X, '.'], is_list(X), % the whole sentence is a finding
    find_sem_sent(P,X), !.

% parses and retracts wellformed string table - parses sentence
attemptparse(P,Bs,sentence,Semlist,Ftype,Atotal) :-
    retractall(wfst(_,_,_,_,_,_)),
    retractall(addstotal(_)),
    sem_sent(P,Semlist,Atotal,Bs,[]), !.

% parses and retracts wellformed string table - parses bodypart only
attemptparse(P,Bs,bodypart,_,_,_) :-
    sem_bodyloc(P,Bs,[]),
    retractall(wfst(_,_,_,_,_,_)), !.

%segmentandparse(+Sentences,-Fmtlist,-Failures,-Unsent,+Section,+Mode,
%               +Examtype,+Sentno)
%   Sentences is list of sentence segments.
%   Fmtlist consists of the formatted output for the segments
%   Failures is the list of unparsed segments.
%   Unsent is the list of segments with undefined words.
%   Section is the section being processed, Mode is the user specified mode
%   Examtype is the domain and Sentno is the sentence id.
segmentandparse([],[],[],[],_,_,_) :- !.
segmentandparse(Sentences,Fmtlist,Failures,UnSent,Section,Mode,
                Examtype,Sentno) :-
    get_sentence(Sentences,S,Rest), !, %sentence to segment
    preprocess(S,S1,_,Semlist,Mode), !,
    (Mode = mode2, NewPmode = bpseg2, !;
     Mode = mode3, NewPmode = bpseg3, !;
     NewPmode = bpseg
    ),
    ( segment1(S1,Segs,[],seg), !,
      parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                     Sentno,Sentno,0), !
    ; segment2(S1,Segs,[],seg), !,
      parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                     Sentno,Sentno,0), !
    ; segment3(S1,Segs,[],Negstatus,seg), !,
      parse_sentences(Segs,Fmt1,Fails,_,Un1,Section,NewPmode,Examtype,
                     Sentno,Sentno,0), !
    ),
    % fails if cannot segment sentence; otherwise segments remainder
    segmentandparse(Rest,Fmt2,Nexterrors,NextUns,Section,Mode,
                    Examtype,Sentno),
    append(Fmt1,Fmt2,Fmtlist),
    append(Un1,NextUns,UnSent),
    append(Fails,Nexterrors,Failures), !.

%segment1(+S,-Segs,+Beg,+Message)
%   S is list of words in sentence
%   Segs consists of sentence segments as separate sentences
%   Beg is list of words in sentence prior to the current portion of sentence
%   Message is 'seg' if segmenting succeeded and 'noseg' otherwise
segment1([],[],_,noseg) :- !.
% segment sentence at connect phrase/word or at most conjunctions
% if negation precedes, restore negation

```

```

segment1([X|Rest],[',','<eos>'|Rem],Beg,seg) :-
    \+ sem_endmark(Rest,[]), % don't segment if at end already
    foundword(X,Sem,Target), % get semantic classification and target
    ( X = nor, append([no],Rest,Rem) % ok to segment at nor
    ; X = without, append([no],Rest,Rem) % ok to segment at without
    ; X = ':', Rest = Rem
    ; Sem = neg, Rest = [Next|Rest2], % have negation; test word after
      foundword(Next,Sem2,Target2), % for connective - add back negation
      testforconn(Next,Sem2,Target2), Rem = [X|Rest2]
    ; testforconn(X,Sem,Target), Rest = Rem
    ).

segment1([X|Rest],[X|Newrest],Start,Seg) :-
    append(Start,[X],Beg), % part before segmentation
    segment1(Rest,Newrest,Beg,Seg).

testforconn(X,Sem,Target) :-
    ( Sem = p, Target = [P,conn], P \= with % segment at connective prep
    ; member(Sem,[vconn,vshow]) % segment at these types of verbs
    ; Sem = conj, \+ member(X,[and,or,',','/',as])
    ).

% segment at certain words -
segment2([],[],[],noseg) :- !.

segment2(S,Segs,[],seg) :-
    seg2(S,Rest,Segs),
    \+ sem_endmark(Rest,[]), !.
segment2([X|Rest],[X|Newrest],[],Seg) :-
    segment2(Rest,Newrest,[],Seg).
seg2([X|Rest],Rest,['.', '<eos>'|Rem]) :-
    member(X,[which,that,until,where,when,while,who,
    '(', ')', between, whereby, after, before, prior,
    greater, ranging]),
    Rem = Rest, !.

segment3([],[],_,_,noseg) :- !.
% segment at conjunction - if negation preceded conjunction, add
segment3([X|Rest],Rem,Beg,Negstatus,seg) :-
    \+ sem_endmark(Rest,[]), !, % already at end of sentence
    seg3([X|Rest],Rem,Beg,Negstatus,seg), !.

seg3([X|Rest],Rem,Beg,Negstatus,seg) :-
    wdef(X,conj,_),
    member(X,[and,or,',']),
    (nonvar(Negstatus), Rem = ['.',Negstatus|Rest], ! %restore negation
    ; Rem = ['.', '<eos>'|Rest], !
    ).
seg3([X|Rest],[X, '.', '<eos>'|Rest],_,_,seg) :-
    foundword(X,age), !.

seg3([X|Rest],[X|Newrest],Start,Negstatus,Seg) :-
    ( nonvar(Negstatus), !; % 1st neg already found - continue segmenting
    foundword(X,Sem,Target), !,
    ( Target = no, Negstatus = X, !;
      Sem = neg, Negstatus = X, !;
      Sem \= neg, Target \= no, !
    );

```

```
        true, !      % word is undefined
    ),
    append(Start, [X], Beg),      % part before segmentation
    segment3(Rest, Newrest, Beg, Negstatus, Seg), !.

% for finding type classes - parse as a sentence
whattoparse(Sem, P, Sent) :-
    member(Sem, [cfinding, pfinding, morph, disease, device, proc, mproc, descriptor]),
    attemptparse(P, Sent, sentence, [Sem], impression, _).

% for bodyloc classes - parse as a bodyloc modifier
whattoparse(Sem, P, Sent) :-
    member(Sem, [bodyloc, region, side, position]),
    attemptparse(P, Sent, bodypart, _, _, _).
```

```

% file radrec.pl
% September 7, 1999
% fail an unknown predicate
:-unknown(_,fail).
:- op(900, fy, [\+,not,once]).      % same priority and type as \+
:- op(700, xfx, [\=,~=]).          % same priority and type as = or ==
:- dynamic(domain/1).              % domain being processed
:- dynamic(outputform/1).          % form of output (needed to distinguish
                                   % markup of text from formatting forms
:- dynamic(currentsect/1).         % section for outputting results

test_genome(Outfile,Errfile,Unfile) :-
    get_inputsents([],Toklist), !, % read in and tokenize input
    (Toklist = [], !, % error condition
     app_err1(_,Outfile,'No input sent'), !
    );
    parse_sentences(Toklist,Fmtlist,Failed,UnDef,UnSent,impression,
bp,genome,_,_,0),!,
    outputresults(Fmtlist,Failed,Errfile,UnDef,Unfile,UnSent,Outfile,
full,line,genome,1,0,_,exe,plain)
).

outputresults(Fmtlist0,Failed,Errfile,UnDef,Unfile,UnSent,Outfile,
Amount,Type,Exam,Compno,DocComp,NewCompno,Caller,Protocol) :-
    tell(Outfile),
    (Protocol = sgml, !, Op = sgml;
     Caller = server, !, Op = sgml;
     Op = plain),
    (Type = nested, !, % original output form - nested findings
     write('<nested>'),new_line(Op),
     write(Fmtlist), new_line(Op), write('</nested>'),
     new_line(Op), !
    ),
    (Caller = server,
     write_message(Unfile,UnDef,Caller,'<undefined>','</undefined>')
    );
    Caller = exe, UnDef \= [],
    write_message(Unfile,UnDef,Caller,'***** Undefined Words *****',[])
    ,%write_highlight([],UnSent,Caller)
    ;
    true
    ),
    (Caller = server,
     write('<noparse>'),!,
     write_highlight(UnDef,UnSent,Caller),
     write_highlight([],Failed,Caller), write('</noparse>')
    );
    Caller = exe, Errfile \= [], Failed \= [],
    tell(Errfile),
    write('***** Sentences/Phrases Not Parsed *****'), nl,
    %write_highlight(UnDef,UnSent,Caller),
    write_highlight([],Failed,Caller)
    ;
    true % no Errfile to write to
    ).

% set_args: Process options

```

```

% Argument options
% -p ProbFile (otherwise default is problem messages are not written to file)
% -i Infile (if input is supplied by file and not standard input)
% -m Mode (default is bp; the 6 choices are bp, model - mode5)
% -o Outfile (if output should be file and not standard output)
% -? Provide list of default arguments
% -pr Protocol - sgml or plain (default is plain)
% -u Undefs (otherwise default is - undefined messages are not written
%   to a file)
set_args(Args,Mode,Infile,Outfile,Prbfile,Undef,Protocol) :-
    set_mode(Args,Mode), set_amount(Args,Amount),
    set_protocol(Args,Protocol),
    set_infile(Args,Infile), set_outfile(Args,Outfile),
    set_prbfile(Args,Prbfile), set_undefs(Args,Undef).

set_mode(Args,Mode) :-
    (nextto('-m',M,Args); nextto(m,M,Args)), !,
    modeis(M,Mode), !.
set_mode(_,bp). % default output type

modeis(relax,mode2) :- !.
modeis(strict,model) :- !.
modeis(skip,mode4) :- !.
modeis(longest,mode3) :- !.
modeis(best,bp) :- !.
modeis(model,model) :- !.
modeis(mode2,mode2) :- !.
modeis(mode3,mode3) :- !.
modeis(mode4,mode4) :- !.
modeis(mode5,mode5) :- !.

set_protocol(Args,Protocol) :-
    (nextto('-pr',Protocol,Args); nextto('pr',Protocol,Args)),
    member(Protocol,[sgml,plain]), !.
set_protocol(_,plain).
set_undefs(Args,Undefs) :-
    nextto('-u',Undefs,Args); nextto(u,Undefs,Args), !. % undef file option
set_undefs(_,[]). % default is no file of undefineds created

set_infile(Args,Infile) :-
    nonvar(Infile), !; % Infile is set already
    nextto('-i',Infile,Args), !;
    nextto(i,Infile,Args), !.
set_infile(_,user_input). % default is standard input

set_prbfile(Args,Prbfile) :-
    nextto('-p',Prbfile,Args), !; nextto(p,Prbfile,Args), !. % prob file option
set_prbfile(_,[]). % default is no file of problems is created

set_outfile(Args,Outfile) :-
    nonvar(Outfile), !; % Outfile is already set
    nextto('-o',Outfile,Args), !; nextto(o,Outfile,Args), !. % outfile option
set_outfile(_,user_output). % default is standard output

new_line(sgml) :- write('<br>'), nl, !.
new_line(server) :- write('<br>'), nl, !.
new_line(exe) :- nl.

```

```

new_line(plain) :- nl.
write_message(_, [], exe, _, _) :- !.
write_message([], _, exe, _, _) :- !.
write_message(_, [], plain, _, _) :- !.
write_message([], _, plain, _, _) :- !.
write_message(File, Contents, Caller, Begmsg, Endmsg) :-
    ( member(Caller, [exe, plain]), tell(File), !
    ;
    true),
    write(Begmsg), new_line(Caller),
    (Contents = [] ; write_list(Contents, 1), new_line(Caller)
    ),
    (Endmsg = [] ; !
    ; write(Endmsg), !, new_line(Caller)
    ).

sendend([X|_], Caller) :-
    member(X, ['.', ';', '?']), new_line(Caller), !.

gettargets([], []) :- !.
gettargets([ignore|Rest], [ignore|Rest]) :- !. % possibly ignore info.
gettargets([W1|Rest], [T1|Trest]) :-
    foundword(W1, _, T1), % target for W1
    gettargets(Rest, Trest), !.
gettargets(W, W). % not in lexicon
isneg(X) :-
    intersect(X, [no, negative, deny, 'rule out']).

writeoutsent([Word|Rest]) :-
    write(''), write(Word), write(''), !,
    (Word = '' ; write(''), !; true),
    (Rest \= [] ; write(','), !, writeoutsent(Rest), !;
    true), !.

```



```

% This file contains predicates associated with SGML tags
% nextTag(+L,Tag,-PreTag,-PostTag) is true if
%     L is the starting List
%     Tag is an SGML tag; it could be a variable or instantiated already
%     PreTag is portion of L preceding Tag
%     PostTag is portion of L following Tag
nextTag(L,Tag,PreTag,PostTag) :-
    append(PreTag,['<',Tag,'>'|PostTag],L).

% endTag(+L,+Tag,-Pre,-Post) is true if
%     L is the starting list
%     Tag is the SGML end tag
%     Pre is the portion of L preceding the end of tag
%     Post is the portion of L following the end of tag
endTag(L,Tag,Pre,Post) :-
    append([Pre,['<','/',Tag,'>'],Post],L).

% enclosedPart(+L,+Tag,-Enclosed) is true if
%     L is the starting List; it is assumed that L is portion of some
%     list that follows a begin tag - i.e. '<',Tag|L
%     Tag is the SGML tag
%     Enclosed is the portion of text enclosed in tag; not including
%     end tag.
enclosedPart(L,Tag,Enclosed,Post) :-
    endTag(L,Tag,Enclosed,Post).

```

```

% file useful.pl - lexical lookup and utility tools
:-unknown(_,fail).
:-dynamic(sentence/1).
:- op(900, fy, [not,once]). % same priority and type as \+
:- op(700, xfx, [\=, -=]). % same priority and type as = or ==
% useful.pl February 21, 1992
%
% preprocess(+S,+Bs1,-U,-Sem3,+Mode): preprocesses sentence to
%      bracket lexical phrases and remove words/phrases in
%      special db of noise words (nosem in nsphrase.pl db)
%      S is original sentence
%      Bs1 is preprocessed sentence
%      U is list of undefined words in sentence
%      Mode is mode of process - in skip mode undefined words are removed
%      from preprocessed sentence
preprocess(S0,Bs1,U,Sem3,Mode) :- %cfnew
    checkbeg(S0,S), % if beginning is 'A)' ignore
    checkphrase(S,S1,Sem1), % bracket all phrases in phrasal lexicon first
    checklist(S1,U1,Bs,Sem2,Mode), % check that all words are in lexicon, remove
non semantic
    checklist(Bs,U,Bs1,Sem3,Mode). % check for phrases after non-sem are removed
    %append(Sem1,Sem2,Sem1),
    %append(Sem1,Sem3,Semlist),
    %union(U1,U2,U).
% found checks if word X is defined as a single word, or if X starts a defined
% phrase
foundword(X) :-
    wdef(X,_,_), !.
foundword(X) :-
    semw(X,_,_,_), !.
%definition from tagged input
foundword(X) :-
    phr(X,_,_,_), !.
foundword([X|Rest]) :-
    Rest \= [],
    phrasal(X,_,[X|Rest],_), !.
% 3/99 added foundword to search the new semact.pl lexicon
% phrasal using semp was added to util.lp
% found/2 returns semantic cat. of word
foundword(X,Sem) :-
    wdef(X,Sem,_).
foundword(X,Sem) :-
    semw(X,Sem,_,_).
%definition from tagged input
foundword(X,Sem) :-
    phr(X,Sem,[],_).
foundword([X|Rest],Sem) :-
    phrasal(X,Sem,[X|Rest],_).
% found/3 returns semantic cat. and target form
foundword(X,Sem,Form) :-
    wdef(X,Sem,Form).
foundword(X,Sem,Form) :-
    semw(X,Sem,Form,_).
%definition from tagged input
foundword(X,Sem,Form,_) :-
    phr(X,Sem,[],Form).
foundword([X|Rest],Sem,Form) :-

```

```

phrasal(X, Sem, [X|Rest], Form).

%collectsem(+Word, -Sem): Sem is the list of semantic classes corresponding
% to Word
collectsem(Word, Sem) :-
    setof(X, foundword(Word, X), Sem).
% missing checks if a word present in a sentence is defined
missing(X) :-
    member(X, S),
    not foundword(X).
% checkbeg(+S0, -S) checks beginning of sentence; if it begins with a letter or
% number followed by a ')', that part is skipped
checkbeg([X, ']'|Rest], Rest) :- !.
checkbeg(X, X).

% checks every word in a list to see if it is defined; creates
% a new list of words not defined, and a new list of sentence
% where phrases are bracketed.
checklist([], [], [], [], []).
% if X is a list it has already been identified as a phrase in phrasal lex
checklist([X|Rest], Undef, Newrest, Semlist, Mode) :-
    is_list(X),
    check_no_sem([X|Rest], Rest1, []),
    checklist(Rest1, Undef, Newrest, Semlist, Mode), !. %is phrase part of nosem
checklist([X|Rest], Undef, [X|Newrest], Semlist, Mode) :-
    %collectsem(X, Sem),
    is_list(X), X = [W1|Tail],
    phrasal(W1, Sem, X, []),
    checklist(Rest, Undef, Newrest, Sem2, Mode), !,
    append([Sem], Sem2, Semlist).
checklist([without|Rest], Undef, Newrest, Semlist, Mode) :-
    checklist([with, no|Rest], Undef, Newrest, Semlist, Mode).
% this problem has to be fixed in preprocessor
% check for a number with a ',' - "11,200" and fix it
%checklist([X, ',', Y|Rest], Undef, [N|Newrest], [number|Semlist], Mode) :-
%    number(X), number(Y), N is X * 1000 + Y, !,
%    checklist(Rest, Undef, Newrest, Semlist, Mode), !.
% check for a literal number %cfnew
checklist([X|Rest], Undef, [X|Newrest], [number|Semlist], Mode) :-
    number(X),
    checklist(Rest, Undef, Newrest, Semlist, Mode), !.
% beginning of List is a prefix of a phrase that is a complete finding
checklist(List, Undef, [Phrase|Newrest], [cfinding|Semlist], Mode) :-
    check_sem_finding(List, Rest, Phrase),
    checklist(Rest, Undef, Newrest, Semlist, Mode), !.
% beginning of List is a prefix of a phrase that is in nose semantic lexicon
checklist(List, Undef, Newrest, Semlist, Mode) :-
    check_no_sem(List, Rest, Phrase),
    checklist(Rest, Undef, Newrest, Semlist, Mode), !.
% beginning of List is a prefix of a phrase that is in phrasal lexicon
checklist(List, Undef, [Phrase|Newrest], Semlist, Mode) :-
    get_longest_sem(List, Rest, Phrase, Sem),
    %check_sem(List, Rest, Phrase, Sem), %change to get longest phrase
    checklist(Rest, Undef, Newrest, Sem2, Mode), !,
    append(Sem, Sem2, Semlist).
% beginning of List is a single word that is in semantic lexicon
checklist([X|Rest], Undef, [X|Newrest], Semlist, Mode) :-

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collectsem(X,Sem), !,
%foundword(X,Sem), !,
checklist(Rest, Undef, Newrest, Sem2, Mode), !,
append(Sem, Sem2, Semlist).
% beginning of List is an undefined word
checklist([X|Rest], Undefs, Nrest, Semlist, Mode) :-
    checklist(Rest, Undef, Newrest, Semlist, Mode),
    (member(X, Undef), !; Undefs = [X|Undef], !),
    (Mode = skip, !, Nrest = Newrest;
     Mode = bpskip, !, Nrest = Newrest;
     Nrest = [X|Newrest]), !.

% if beginning is a number followed by a . followed by a non number
% skip; %cfnew
checkphrase([X,.], [X,.], []) :- !.
checkphrase([X,.Z|Rest], Y, Semlist) :-
    number(X), not(number(Z)), checkphrase(Rest, Y, Semlist), !.
% beginning of List is a prefix of a phrase that is a complete finding
% or a phrase in phrasal lexicon
checkphrase(List, [Phrase|Newrest], Semlist) :-
    (check_sem_finding(List, Rest, Phrase), Sem = [cfinding];
     get_longest_sem(List, Rest, Phrase, Sem)
    ), !,
    %check_sem(List, Rest, Phrase, Sem), !,
    checkphrase(Rest, Newrest, Sem2), !,
    append(Sem, Sem2, Semlist).
checkphrase([W|Rest], [W|Newrest], Semlist) :-
    checkphrase(Rest, Newrest, Semlist).
checkphrase([], [], []).

check_sem_finding([W|Tail], Tail, W) :-
    W = [W1|Rest], % W is bracketed already
    sem_finding_sent(W1, W, _).
check_sem_finding([W|Tail], Sfinal, Phrase) :-
    sem_finding_sent(W, Phrase, _),
    begsublist(Phrase, [W|Tail], Sfinal), !.
sem_finding_sent(_, _, _) :- fail.
% check_no_sem(+Sent, -Rest, -Phrase): removes Phrase from Sent resulting
% in Rest if Sent begins with a phrase in nosem (non-semantic list).
check_no_sem([W|Tail], Sfinal, Phrase) :-
    nosem(W, Phrase), %phrase beg. with W that should be removed
    begsublist(Phrase, [W|Tail], S1),
    remove_comma(S1, Sfinal), !. % remove "," if it is next
%get_longest_sem(+Sent, -Rest, -Phrase, -Sem): Phrase is longest phrase that is
% a prefix of Sent; Rest is remainder and Sem is list of semantic classes
get_longest_sem(Sent, Rest, Phrase, [Sem]) :-
    setof(X, check_sem(Sent, X), L), % set of Phrases
    maxphrase(L, [], Phrase, 0), % Phrase with maximum length
    append(Phrase, Rest, Sent), % rest of sentence after Phrase
    foundword(Phrase, Sem).

% check_sem(+Sent, -Rest, -Phrase, -Sem): checks if phrase beginning with
% Sent is in phrasal lexicon; Rest is the remainder of Sent after phrase
% Sem is the semantic class
check_sem([W|Tail], Rest, Phrase, Sem) :-
    phrasal(W, Sem, Phrase, _),
    begsublist(Phrase, [W|Tail], Rest).

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%      this also obtains the Target form
check_sem([W|Tail],Rest,Phrase,Sem,Target) :-
    phrasal(W,Sem,Phrase,Target),
    begsublist(Phrase,[W|Tail],Rest).
check_sem([W|Tail],Tail,W,Sem) :-
    is_list(W),      %enclosed in brackets means it is a phrase
    W = [W1|Rest],
    phrasal(W1,Sem,W,_), !.
check_sem([W|Tail],Tail,W,Sem,Target) :-
    is_list(W),      %enclosed in brackets means it is a phrase
    W = [W1|Rest],
    phrasal(W1,Sem,W,Target), !.
% check_sem(+Sentence,-Phrase) is similar to check_sem/4 except for fewer args
check_sem(Sentence,Phrase) :-
    check_sem(Sentence,_,Phrase,_).

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% file util.pl
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Utility Predicates %%%%%%%%%%%%%%%

% fail an unknown predicate
:-unknown(_,fail).
:- op(900, fy, [not,once]). % same priority and type as \+
:- op(700, xfx, [\=,~=]). % same priority and type as = or ==

:- dynamic(wfst/6).
:- dynamic(addstotal/1).
:- dynamic(paragno/1).
:- dynamic(sectno/1).
:- dynamic(phr/4).

% wfst(+Rule,+Number,+Res,+Fmt,+S0,+S): well-formed symbol table
% Rule is the name of rule; Number is the option number
% Res is s for success and f for failure
% Fmt is the format (for successes); for failure Fmt is []
% S0 is the sentence position at the start of Rule
% S is the sentence position when Rule has been completed
% add to wfst

addst(Rule,Number,Res,Fmt,S0,S) :-
    \+ checkst(Rule,Number,Res,Fmt,S0,S), %result for rule was saved already
    \+ checkst(Rule,Number,i,Fmt,S0,S), % result from different rule saved
    ( checkst(Rule,_,Res,Fmt,S0,S), % different rule produced same result
      assert(wfst(Rule,Number,i,Fmt,S0,S));
      assert(wfst(Rule,Number,Res,Fmt,S0,S))), !.
addst(_,_,_,_,_,_) :- !. % always succeed

% checkst(+Rule,-Number,-Res,-Fmt,+S0,-S): checks to see if rule has been saved
% in wfst
checkst(Rule,Number,Res,Fmt,S0,S) :-
    wfst(Rule,Number,Res,Fmt,S0,S).

% beglist(L,Y) - is Y the head of list L
beglist([X|_],Y) :- X = Y, !.
% splice(+L1,-L2) : L1 is a list of lists; L2 is merged list
splice(L1,L2) :- append(L1,L2), !.
%splice([],[]) :- !.
%splice([[]],[]) :- !.
%splice([X],X) :- !.
%splice([[]|L1],L2) :- splice(L1,L2),!.
%splice([[]|[]|L1],L2) :- splice(L1,L2),!.
%splice([X|[]],L) :- splice(X,L),!.
%splice([L1,L2],L3) :-
% append(L1,L2,L3), !.
%splice([X|L1],L2) :-
% splice(L1,L2),
% append(X,L2,L2), !.

%splicerel - works with relations which have Arg1,...,Argn.
% It splices a Splicelist in each arg of relation
splicerel(Finding,Splicelist,Spliced) :-
    splice(Splicelist,Sp1),
    (Finding = [rel,X|Rest], spliceargs(Rest,Sp1,Sp),
     %splice([rel,X],Sp,Spliced), !;

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        append([rel,X],Sp,Spliced),!;
        %splice([Finding,Sp1],Spliced) ).
        append(Finding,Sp1,Spliced) ).
%spliceargs - Splices a list into each element of a list
spliceargs([],_,[]) :-!.
spliceargs([Arg1|Rest],Splicelist,Spliced) :-
    %splice([Arg1,Splicelist],Sarg1),
    append(Arg1,Splicelist,Sarg1),
    spliceargs(Rest,Splicelist,Srest),
    %splice([Sarg1],Srest,Spliced) .
    append([Sarg1],Srest,Spliced) .
list([],[]).
list([X|[]],X).
list([X|L1],L2) :- list(L1,L3),
                    append([X],L3,L2), !.

% strip(L1,L2) removes extra square brackets from L
strip([L],L).

% B is a suffix of A and C is the difference
difflist(A,B,C) :- append(C,B,A).
% S is a sublist at beg. of L if there is a list Rest, which when appended
% to S results in L.
begsublist(S,L,Rest) :- append(S,Rest,L), !.
% checks that first element in list S has semantic category in Semlist
firstword([W1|_],Semlist) :-
    atom(W1), wdef(W1,Sem,_), % semantic category
    member(Sem,Semlist).
firstword([W1|_],Semlist) :-
    is_list(W1), phrasal(W1,Sem,_),
    member(Sem,Semlist).
% removes phrases from first arg that are in nsphrase - lexicon of non-sem.
phrases
remove_no_sem([],[]) :- !.
remove_no_sem([W|Tail],Sfinal) :-
    nosem(W,Phrase), %phrase beg. with W
    begsublist(Phrase,[W|Tail],S1), %remove from sentence
    remove_comma(S1,S2), %remove "," if it is next
    remove_no_sem(S2,Sfinal), !.
remove_no_sem([W|Tail],Sfinal) :-
    remove_no_sem(Tail,S1),
    append([W],S1,Sfinal) , !.
remove_comma([' ', '|Tail],Tail).
remove_comma(S,S).
% remove_sem(+Sent,-NewSent): Sent is the original sentence, NewSent is
% stripped of all phrases that are defined in lexicon
remove_sem([],[]) :- !.
remove_sem(S,NewS) :-
    check_sem(S,Rest,_), % phrase in sent. is in lexicon - remove it
    remove_sem(Rest,NewS), !.
remove_sem(S,NewS) :-
    check_no_sem(S,Rest,_), % phrase in sent. is in nosem list - remove it
    remove_sem(Rest,NewS), !.
remove_sem([X|Tail],[X|NewS]) :-
    remove_sem(Tail,NewS), !. % not a phrase, process rest
% remove_words(+Sent,-NewSent): Sent is the original sentence, NewSent
% is stripped of all words that are in lexicon

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remove_words([],[]) :- !.
remove_words([X|Rest],NewRest) :-
    ( (foundword(X); number(X)),      % X is defined in lexicon
      remove_words(Rest,NewRest) , !;
      remove_words(Rest,New), NewRest = [X|New], ! % X is not in lexicon
    ).

%maxphrase(+ListofPhrases,+Maxin,-MaxOut,InitMaxLen) is true if
% ListofPhrase is a list of multi-word phrases,
% Maxin is phrase with maximum words so far
% MaxOut is phrase with maximum length of phrases in ListofPhrases
% InitMaxLen is length of initial phrase which is of max. length
maxphrase([],Maxin,Maxin,_) :- !. % no more phrases - maximum is same as maxin
maxphrase([P|Rest],Maxin,Maxout,InitMaxLen) :-
    length(P,Len), % length of first phrase
    ( Len > InitMaxLen, !, maxphrase(Rest,P,Maxout,Len);
      Len < InitMaxLen, !, maxphrase(Rest,Maxin,Maxout,InitMaxLen)
    ).

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%% lexical interface predicates %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%acclex(Sem,W,S0,S) :-
%  outputform(htext), !, acclex1(Sem,W,S0,S).
acclex(Sem,W,S0,S) :-
    acclex2(Sem,W,S0,S).
acclex(Sem,W,S0,S) :-
    acclexss(Sem,Syn,Target,Features,S0,S).
% check lexicon for word or phrase, Target form is original W
acclex1(p,[P,C],[W|Rest],Rest) :-
    is_list(W),
    find_sem_phrase(p,[P,C],W).
acclex1(p,[P,C],[W|S],S) :- atom(W),
    wdef(W,p,[P,C]).
acclex1(Sem,[W],[W|Rest],Rest) :-
    is_list(W), %if bracketed list, get Sem and Code from phrasal lexicon
    find_sem_phrase(Sem,_,W).

acclex1(Sem,W,[W|S],S) :- atom(W),
    wdef(W,Sem,_).
% check lexicon for word or phrase, Target form is taken from lexicon
%acclex2(Sem,Code,[W|Rest],Rest) :-
%  is_list(W), %if bracketed list, get Sem and Code from phrasal lexicon
%  find_sem_phrase(Sem,Code,W).

acclex2(Sem,Code,[W|S],S) :- foundword(W,Sem,Code),
    nonvar(Code). % protect against
lex. error
% find a phrase [W|Tail] in lexicon that begins with W and has category Sem
find_sem_phrase(Sem,Code,[W|Tail]) :-
    phrasal(W,Sem,[W|Tail],Code), % phrase and code beg. with W
    nonvar(Code).
% case where phrase is already bracketed, look up phrase
sem_finding_phrase1(Code,[W|Tail],Tail) :-
    is_list(W), %phrase is bracketed
    find_sem_sent(Code,W),
    nonvar(Code). %protect against lexical error
% case where phrase is already bracketed, look up phrase
sem_finding_phrase2(Code,[W|Tail],Tail) :-
    is_list(W), %phrase is bracketed

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        find_sem_sent(Code,W),
        nonvar(Code).      %protect against lexical error
% Phrasal succeeds if lexicon contains phrase
phrasal(W1,Sem,Phrase,Code) :-
    phrase(W1,Sem,Phrase,Code,_).    %multi-word phrase in lexicon
% added March15, 1999
phrasal(W1,Sem,Phrase,Code) :-
    semp(W1,Sem,Phrase,Code,Features).
% lexical definition from marked up input
phrasal(W1,Sem,[W1|Tail],Code) :-
    phr(W1,Sem,Tail,Code).
acclexss(Sem,Syn,Target,Features,[W|S],S):-
    atom(W),
    semw(W,Sem,Target,Features),
    synw(W, Synclass),
    member(Synclass,Syn).
acclexss(Sem,Syn,Target,Features,[W|S],S):-
    is_list(W),
    find_phrasess(W,Sem,Syn,Target,Features).
find_phrasess([W1|Tail],Sem,Syn,Target,Features):-
    semp(W1,Sem,[W1|Tail],Target,Features),
    synp(W1,[W1|Tail],Synclass),
    member(Synclass, Syn).

% lexical definition of a complete finding
find_sem_sent(Code,[W|Tail]) :-
    sem_finding_sent(W,[W|Tail],Code).

listify(C,[C]) :-
    atom(C), !.
listify(C,C) :-
    is_list(C), !.

% distributes left mods and right mods over list of findings creating
% list of lists of findings with mods
distributemods([],[],_,_) :- !.
distributemods(Dist,[D1|Tail],Lmods,Rmods,Type) :-
    distributemods(Dist2,Tail,Lmods,Rmods,Type), %distributed for remainder
    mergemods(Lmods,Rmods,Allmods),
    frame(D,Type,D1,Allmods),      %Type frame with mods
    append([D],Dist2,Dist).      % Combine findings to get list of findings

% fixconj - if Leftmods has [certainty,no], and Conj = or, change Conj to and.
%      no A or B = no A and no B; 'denies A,B, or C' is similar.
fixconj(Leftmods,Conj,[rel,and]) :-
    (member([certainty,no],Leftmods); member([certainty,deny],Leftmods)),
    Conj = [rel,or].
fixconj(_,Conj,Conj).

%      write_sentences/1 inputs a PROLOG list and prints out lines
%      which which are English sentences. No wrapping is done.
write_sentences([]) :- !.
write_sentences([X]) :- write(X), nl. % special sentence - section name
write_sentences(['<',p,'/','>']) :-
    write('<p/>'), nl. % paragraph mark
write_sentences([X|Rest]) :-
    upper_first([X|Rest],[U|Rest]),

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        write(U), % First letter of first word made upper case
        %write(X),
        (X = U, chkforpunct(U,Rest), !, write_terms(Rest); % no space needed
        write(' '), write_terms(Rest)
    ).

%       write_sentence/2 inputs a PROLOG list and prints out an English
%       sentence wrapped. Idlen is the starting position of the sentence
%       in the output.
%       uses libraries ctype, basic, not
write_sentence([X|Rest],Idlen) :-
    upper_first([X|Rest], [U|Rest]),
    write(U),
    name(U,LU),length(LU,L),
    (U = X, chkforpunct(U,Rest), !, write_terms(Rest, L+Idlen);
    write(' '), write_terms(Rest, L+Idlen+1)
    ).

%       write_list inputs a PROLOG list and prints out a sentence like list.
%       wrapped. Idlen is the starting position of the list in the output.
write_list([X|Rest],Idlen) :-
    write(X),
    name(X,LU),length(LU,L),
    (chkforpunct(X,Rest), write_terms(Rest, L+Idlen), !;
    write(' '), write_terms(Rest, L+Idlen+1)).
%write_list(+List,+Idlen,-Idlenout)
% write_list prints out a sentence like list with wrapping if necessary.
% List is the list to be printed
% Idlen is the column position at start
% Idlenout is the column position at end
write_list([],Len,Len) :- !.
write_list([X|Rest],Idlen,Idlenout) :-
    atomic(X), write(X),
    name(X,LU), length(LU,L),
    (L + Idlen > 74, nl, Idlen2 = 1, !;
    Idlen2 = L + Idlen, !
    ),
    (chkforpunct(X,Rest), write_list(Rest,Idlen2,Idlenout), !;
    write(' '), write_list(Rest,L+Idlen2+1,Idlenout), !
    );
    is_list(X), write_list(X,Idlen,Idlen2), write_list(Rest,Idlen2,Idlenout).

upper_first([X|Rest], [U|Rest]) :-
    name(X, [L|Z]),
    (is_alpha(L), Up is L - 32, !; Up = L),
    name(U, [Up|Z]), !.

% write_terms/1 writes out a word followed by blank, except for punctuations.
write_terms([]) :- !.
% case where X is end of sentence
write_terms([X|Rest]) :-
    (X = '.'; X = ';'), % last word of sentence
    write(X), nl, !, write_sentences(Rest), !.
% case where X is interior of sentence
write_terms([X|Rest]) :-
    write(X),
    (chkforpunct(X,Rest), write_terms(Rest);

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        write(' '), write_terms(Rest)
    ), !.
% write_terms(List,Used): writes the terms in list and counts the number
%   of columns used; starts new line if 75 columns have been used
write_terms([],_) :- !.
% at end of list
write_terms([.],_) :- write('.'), nl,!.
write_terms([;],_) :- write(';'), nl,!.
% X is a punctuation, don't add to final count
write_terms([X|R],Used) :-
    ( R = [], write(' '), write(X), !;
      chkforpunct(X,R),
      write(X), write_terms(R,Used), !
    ).
% X is last word in sentence
write_terms([X,], Used):-
    name(X, List), length(List, Len),
    Need is Len + 2,
    Total is Used + Need,
    (Total =< 75, write(' '),write(X), write(.));
    Total > 75, nl, write(' '),write(X), write(.)),
    nl, !.
% X is last word in sentence
write_terms([X,;], Used):-
    name(X, List), length(List, Len),
    Need is Len + 2,
    Total is Used + Need,
    (Total =< 75, write(' '),write(X), write(';'));
    Total > 75, nl, write(' '),write(X), write(.)),
    nl, !.
% X is followed by ','
write_terms([X,',',|Rest], Used):-
    name(X, List), length(List, Len),
    Need is Len + 2,
    Total is Used + Need,
    (Total =< 75, write(' '),write(X), write(','),
      write_terms(Rest, Total);
    Total > 75, nl, write(' '),write(X), write(','),
    New is Need - 1, write_terms(Rest, New)),
    !.
% writes blank + name of X, used is length of name+1
write_terms([X|Rest], Used):-
    name(X, List), length(List, Len),
    Need is Len + 1,
    Total is Used + Need,
    (Total =< 75, write(' '), write(X), write_terms(Rest, Total);
    Total > 75, nl, write(' '),write(X), write_terms(Rest, Len)),!.
write_terms(['X','s'|Rest], Used):-
    name(X, List), length(List, Len),
    Need is Len + 3,
    Total is Used + Need,
    (Total =< 75, write(' '), write(X),write("'s"),
      write_terms(Rest, Total);
    Total > 75, nl, write(X), write_terms(Rest, Len)),!.
% processes sentences in Infile; writes formats to Outfile
% sentences beginning with '%' are treated as comments
testsents(Infile,Outfile) :-

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    see(Infile), seen, see(Infile),
    tell(Outfile),
    readtests,
    see(Infile), seen, told.
% reads next sentence and processes it
readtests :-
    read_in(X),
    (X = end_of_file, !;
     X = [eoff, '.'], !;
     X = [''], !;
     X = ['%' | _], !, readtests; % don't process comments
    preprocess(X, Bs, Undef, Semlist, skip),
    ( Undef = [],
      dosent(X, Bs, Semlist, Fmt, Message, impression, W, chestxray, strict, 0),
      write_sentence(X, 1), write(Bs), nl,
      write(Fmt), nl;
      Undef \= [], write_sentence(X, 1), write(Bs), nl, write(Undef), nl),
      readtests % read next sentence
    ).
% Reads in all sentences from input file and creates one list of all sentences
get_inputsents(Prevlist, Toklist) :-
    read_in(X),
    (X = end_of_file, Toklist = Prevlist, !;
     X = [eoff, '.'], Toklist = Prevlist, !;
     X = [''], Toklist = Prevlist, !;
     (last('', X), append(Toklist, [''], X), !; %remove
      append(Prevlist, X, Newlist),
      get_inputsents(Newlist, Toklist)
     )).

%get_sentence(+A, -B, -C)
% Gets next sentence from input list containing all sentences read in
% Don't end a sentence if "." is preceded by a number and followed by
% a number and unit measure - 1.25 cm, 1.5 cm, .5 cm
% or is followed by a "." which is part of abbreviation
% get_sentence(A,B,C) - A is list of all sentences in report.
%                       - B is list containing one sentence
%                       - C is remainder excluding B
% sgml tag for multi-word phrase containing '.' that is not end of sentence
get_sentence(['<', phr | Tail], Sentence, LRest) :-
    enclosedPart(Tail, phr, Between, Rem), % Between beg. part of open phr and
close tag of phr
    append([sem, =, "'", Sem, "''], MoreAttributes, Between), %Sem is value of sem
attribute
    (MoreAttributes = ['>' | Phrase], TargetList = Phrase, !;
     MoreAttributes = [t, =, "'" | TargetPlus], % Target terms plus end of phr
     append(TargetList, ['"', '>' | Phrase], TargetPlus), ! % t attribute followed
by actual phrase
    ),
    Phrase = [W1 | Rest],
    append(Phrase, SRest, Sentence),
    concat_atom(TargetList, Target),
    assert(phr(W1, Sem, Rest, Target)), % assert lex def according to input
    %Phrase = [W1 | PRest],
    %abbrev(W1, [W1 | PRest], Target, _),
    get_sentence(Rem, SRest, LRest), !.

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% Ignore sentence starting with '%', get next sentence
get_sentence(['%', '%'|Rest], Sent, Remainder) :-
    get_sentence(Rest, _, Rem),
    get_sentence(Rem, Sent, Remainder).
get_sentence([X, ., Y, Z|Rest], [X, .], [Y, Z|Rest]) :- % break up "140. 3+"
    number(X), number(Y), Z = '+', !. % Y belongs to '+' for new sentence
get_sentence([X, ., Y, Z|Rest], [N|SRest], LRest) :- % 1.5 cm
    number(X), number(Y),
    %(wdef(Z, unit, _); Z = x),
    Z \= '+', % break up "140. 3+"
    !,
    name(X, D1), name(., D2), name(Y, D3), name('E+00', D4),
    append([D1, D2, D3, D4], D), name(N, D), % put number together
    get_sentence([Z|Rest], SRest, LRest).
% common abbrev
get_sentence([X, .|Rest], [X|SRest], LRest) :- % abbrev ending in "."
% list of common abbreviations seen in reports should not end sentence
member(X, [vs, dr, cm, mg]), get_sentence(Rest, SRest, LRest), !.
% list of start of names in reports should not end sentence
get_sentence([X, .|Rest], [X|SRest], LRest) :- % abbrev ending in "."
member(X, [ms, mr, mrs, dr, st]),
skipname(Rest, Rest0), % skip name part
get_sentence(Rest0, SRest, LRest), !.
% more known abbreviations
get_sentence([W1|Rest], [Rep|SRest], LRest) :-
abbrevchk([W1|Rest], _, Rem, Rep), % abbreviation
get_sentence(Rem, SRest, LRest), !.
% possible simple xml tag for new paragraph
get_sentence(['<', p, '/', '>|Rest], Sent, Rem) :- %skip paragraph marker
get_sentence(Rest, Sent, Rem), !.
% xml tag for sentence '<s>'
get_sentence(['<', s, '>|Tail], Sentence, Rest) :-
enclosedPart(Tail, s, Sent, Rest),
(last('.', Sent), Sentence = Sent, !; %already has '.')
append(Sent, [.] , Sentence)
), !. %add '.'
get_sentence([.|Rest], [.] , Rest) :- !. %end of a sentence
get_sentence([;|Rest], [;] , Rest) :- !.
% interior of sentence
get_sentence([X|Rest], [X|SRest], LRest) :-
get_sentence(Rest, SRest, LRest).
get_sentence([], [], []). % no more sentences

% abbrevchk(+WordList, -AbList, -RemList, -Target) is true if an abbrev is prefix
% of WordList, RemList is suffix of WordList (excluding prefix),
% AbList is prefix consisting of abbreviation
% and Target is target form of abbreviation
abbrevchk([W1|Rest], AbList, RemList, Target) :-
abbrev(W1, AbList, Target, Dom), % abbrev knowledge base indexed by 1st word
append(AbList, Rem, [W1|Rest]), % remainder of abbrev. must be in sentence
(Dom = general, !; % abbrev. applies to all domains
domain(Thisrep), Dom = Thisrep, !; % abbrev. applies to this domain
is_list(Dom), member(Thisrep, Dom) % this domain in abbrev. list
),
( % add back '.' to sentence if it also signals end of sentence
Rem = [], last('.', AbList), RemList = ['.'], ! %no more words
; % words that generally start a new sentence

```

```

    Rem = [W2|_], last('.',AbList), member(W2,[his,her,he,she,the,this]),
    RemList = ['.'|Rem], !
    ; % don't add '.' back
    RemList = Rem
  ).
% skipname(+Beglist,-Endlist): skips next word after "mr" or "st"
skipname([],[]) :- !.
skipname([_,''',s|Rest],Rest):- !. % "Luke's"
skipname([o,''',_|Rest],Rest):- !. % "O'Grady"
skipname([_|Rest],Rest) :- !.

%get_section(+Toklist,-Sents,-Rest,-Section,-Printname,Addno)
% Toklist contains input list; 1st sentence should be a header;
% Sents are all sentences in section; Section is name of section
% Sentences at beg. of Toklist are ignored until a section header is found
get_section([T|Toklist],Sents,Rest,Section,Printname,Addno) :-
  % first sentence should be section header
  get_sentence([T|Toklist],Sentence,RToklist),
  (section_header(Sentence,Rsent,Section,Printname), % Sentence is a section
header
  append(Rsent,RToklist,RToklist2),
  get_sectionsents(RToklist2,Sents,Rest),
  (Addno = 0, !; % testing if input begins with section header
  Addno = 1, !, sectno(Sectno), Newno is Sectno + 1,
  retractall(sectno(_)), assert(sectno(Newno))
  ),
  retractall(paragno(_)), assert(paragno(1)), %1st parag. of section
  retractall(sentno(_)), assert(sentno(0)) %1st sentence of parag.
  ; % 1st sentence is not a legitimate header - return []
  Section = []
  % get_section(RToklist,Sents,Rest,Section) % skip till find header
  ), !.

get_section([],[],[],[],_,_).
get_sectionsents([],[],[]) :- !.
get_sectionsents(Toklist,Slist,Rest) :-
  get_sentence(Toklist,Sentence,RToklist), % one sentence
  (\+ section_header(Sentence,_,_,_), %more sentences in section
  get_sectionsents(RToklist,RSents,Rest),
  append(Sentence,RSents,Slist)
  ; % the next section is a section header - return
  Rest = Toklist, Slist = []).

section_header(S,RestS,'report clinical information item',
  'CLINICAL INFORMATION:..') :-
  (S = [clinical,information,':',''], !, RestS = [];
  begsublist([clinical,information,':'],S,RestS), !;
  S = [clininfo,':',''], RestS = [], !;
  begsublist([clininfo,':'],S,RestS), !
  ).
section_header(S,RestS,'report impression item',
  'IMPRESSION:..') :-
  (S = [impression,':',.], RestS = [], !;
  begsublist([impression,':'],S,RestS), !
  ).
section_header(S,Rest,'report summary item','SUMMARY:..') :-
  S = [summary,':'|Rest].

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```

section_header(S,RestS,'report description item','DESCRIPTION:..') :-
    (S = [description,':'|Rest], RestS = [], !;
     begsublist([description,':'],S,RestS), !
    ).
section_header(S,Rest,'report diagnosis item','DISCHARGE DIAGNOSIS:..') :-
    (S = [discharge,diagnosis,':'|Rest] ;
     S = [final,diagnosis,':'|Rest];
     S = [principle,diagnosis,':'|Rest]; S = [associated,diagnosis,':'|Rest];
     S = [transfer,diagnosis,':'|Rest];
     S = [diagnosis,(' ',es,')',':'|Rest];
     S = [diagnosis,':|Rest]
    ), !.
section_header(S,Rest,'report laboratory data item','LAB DATA:..') :-
    S = [laboratory,data,':'|Rest], !.
section_header(S,Rest,'report medications item','MEDICATIONS:..') :-
    S = [medications,':'|Rest], !.
section_header(S,Rest,'report current medications item','MEDICATIONS:..') :-
    S = [current,medications,':'|Rest], !.
section_header(S,Rest,'report discharge medications item',
'DISCHARGE MEDICATIONS:..') :-
    S = [discharge,medications,':'|Rest], !.
section_header(S,Rest,'report discharge disposition item',
'DISCHARGE DISPOSITION:..') :-
    S = [discharge,disposition,':'|Rest], !.
section_header(S,Rest,'report medications on admission item',
'MEDICATIONS:..') :-
    S = [medications,on,admission,':'|Rest], !.
section_header(S,Rest,'report medications on transfer item',
'MEDICATIONS:..') :-
    S = [medications,on,transfer,':'|Rest], !.
section_header(S,Rest,'report procedure item','PROCEDURE:..') :-
    (S = [operation,':'|Rest]; S = [procedure,':'|Rest]
    ), !.

section_header(S,Rest,'report indications for procedure item','INDICATIONS:..')
:-
    (S = [indications,for,procedure,':'|Rest]; S =
    [indications,for,operation,':'|Rest]
    ),
    !.

section_header(S,Rest,'report preoperative diagnosis item','PREOP DIAGNOSIS:..')
:-
    S = [preoperative,diagnosis,':'|Rest], !.
section_header(S,Rest,'report admitting diagnosis item','ADMITTING
DIAGNOSIS:..') :-
    S = [admitting,diagnosis,':'|Rest], !.
section_header(S,Rest,'report postoperative diagnosis item','DIAGNOSIS:..') :-
    S = [postoperative,diagnosis,':'|Rest], !.
section_header(S,Rest,'report physical examination item',
'PHYSICAL EXAM:..') :-
    S = [physical,examination,':'|Rest], !.
section_header(S,Rest,'report chief complaint item','CHIEF COMPLAINT:..') :-
    S = [chief,complaint,':'|Rest], !.
section_header(S,Rest,'report hospital course item','HOSPITAL COURSE:..') :-
    S = [hospital,course,':'|Rest], !.

```



```

section_header(S,Rest,'report allergy item','ALLERGIES:') :-
    S = [allergies,':'|Rest], !.

section_header(S,Rest,'report follow up item','FOLLOW UP:') :-
    S = [follow,up,':'|Rest], !.
section_header(S,Rest,'report findings item','FINDINGS:') :-
    S = [findings,':'|Rest], !.
section_header(S,Rest,'report indications and findings item','FINDINGS:') :-
    S = [indications,and,findings,':'|Rest], !.
section_header(S,Rest,'report indications and findings item','INDICATIONS:') :-
    S = [indications,':'|Rest], !.
section_header(S,Rest,'report provisional diagnosis item','PRELIM DIAGNOSIS:') :-
    S = [provisional,diagnosis,':'|Rest], !.
section_header(S,Rest,'report review of systems item','REVIEW OF SYSTEMS:') :-
    S = [review,of,systems,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:') :-
    S = [past,history,section,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:') :-
    S = [past,medical,history,':'|Rest], !.
section_header(S,Rest,'report social history item','SOCIAL HISTORY:') :-
    S = [social,history,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:') :-
    S = [history,':'|Rest], !.
section_header(S,Rest,'report past history item','PAST MEDICAL HISTORY:') :-
    S = [brief,history,':'|Rest], !.
section_header(S,Rest,'report history of present illness item',
    'HISTORY OF PRESENT ILLNESS:') :-
    S = [history,of,present,illness,':'|Rest], !.
section_header(S,Rest,'report history of present illness item',
    'HISTORY OF PRESENT ILLNESS:') :-
    S = [history,of,the,present,illness,':'|Rest], !.
section_header(S,Rest,'report specimen item','SPECIMEN') :-
    S = [specimen|Rest], !.

% sentence consists of id number only or "." only.
isidentifier([X,.]) :-
    integer(X).
isidentifier([X,;]) :-
    integer(X).
isidentifier([.]) :- !. % sentence consists only of .
isidentifier(['.',<eos>']) :- !.
isidentifier(['<',p,'/',>']) :- % paragraph marker sentence - update no.
    paragno(N),
    retractall(paragno(_)),
    Newno is N + 1,
    assert(paragno(Newno)),
    retractall(sentno(_)),
    assert(sentno(0)).

% skipsentence is true, if sentence should be ignored.
% Skip sentences containing family info
skipsentence([X|_]) :-
    foundword(X,family), !.
skipsentence([X|_]) :-
    foundword(X,insurance), !.
% This occurs if sentence contains

```



```

% a sequence in skips database and sentence also contains findings.
skipsentence([X|Rest],Semlist,Error) :-
    skips([X|Sseq]), % X is the beg. of subseq. in skip database
    prefix([X|Rest],[X|Sseq]), % sentence contains subseq.
    (subtype(_,Semlist), % sentence contains information to be extracted
     Error = no; % don't try to segment
     Error = yes), !. % treat sentence as error and try to segment.

skipsentence([_|Rest],Semlist,Error) :-
    skipsentence(Rest,Semlist,Error).

% findingseg(+S,-Fseg,-Begseg): partitions sentence
% S is the sentence; Begseg is the segment preceding the
% modifiers of the finding; Fseg is the segment of S starting
% with the leftmost modifier of the finding and consists of the
% remaining sentence.
findingseg(S,Fseg,Begseg) :-
    partition(S,Begpart,Restpart),
    (Begpart = [], Begseg = [];
     Restpart = [], Fseg = [], Begseg = S;
     right1stmod(Begpart,Begseg,Modseg)),
    append(Modseg,Restpart,Fseg).
findingseg(_,[],_) :- !.
actionfindingseg(S,Fseg,Begseg) :-
    partition(S,Begpart,Restpart),
    (Begpart = [], Begseg = [];
     Restpart = [], Fseg = [], Begseg = S;
     reverse(Begpart,ReversedBefore),
     findsubstance(ReversedBefore,Rest),
     append(Substancepart,Rest,ReversedBefore),
     reverse(Substancepart,Leftpart),
     reverse(Rest,Begseg),
     append(Leftpart,Restpart,Fseg)).
actionfindingseg(_,[],_) :- !.
findsubstance([],[]) :- !.
findsubstance([X|Rest],Rest) :-
    substance(_,[X],[]),!.
findsubstance([X|Rest1],Rest) :-
    findsubstance(Rest1,Rest).

% partition(+S,-Begpart,-Restpart): partitions sentence
% S is initial
% partition(+S,-Begpart,-Restpart): partitions sentence
% S is initial sentence; Begpart is part of sentence before the
% finding; Restpart is the rest of the sentence and starts with
% the finding. If there are 2 consecutive findings
% the 1st one is considered a modifier
partition([],[],[]) :- !.
partition([X|Rest],[X|Begpart],Restpart) :-
    not(isfinding(X)), !, partition(Rest,Begpart,Restpart).
partition([X,Y|Rest],[X],[Y|Rest]) :-
    isfinding(X), isfinding(Y), !.
partition([X|Rest],[],[X|Rest]) :-
    isfinding(X), !.

% isfinding(+X): is true if X is a word or phrase whose semantic class
% is a finding or subtype of finding.

```

```

isfinding(X) :-
    foundword(X,Sem),    % semantic class of word
    subtype(_, [Sem]).    % is class a type of finding, recommend, or technique
% semantic class which are types of relevant information
subtype(finding,Sem) :-
    intersect(Sem, [attach, createbond, breakbond, activate,
        inactivate, substitute, transcribe, express, promote,
        signal]).
% there is only one type of technique class
subtype(technique,Sem) :-
    member(technique,Sem).
subtype(time,Sem) :-
    intersect(Sem, [status, sstatus, change, tmper, vstatus]).
findinginlist(Sem) :-
    intersect(Sem, [attach, createbond, breakbond, activate,
        inactivate, substitute, transcribe, express, promote,
        signal]).

% chkforpunct(+W,+Rest): is true if there should be no space after word W
chkforpunct(W,_) :- member(W, ['/', '<', '>', '-', '"', '[', ']',
    '{', '}', ' ', '+', '=', '|', '\\']), !.
% nothing left to write.
chkforpunct(W,[]) :- !.
% is true if there should be no space before word after current word
chkforpunct(_, [W|_]) :-
    ispunct(W).
% ispunct(+W) is true if W is a punctuation for sentence print out
% The following characters are not treated as punct: ~ ` # $ ^ & *
ispunct(W) :- member(W, [' ', '.', '!', ';', '/', '<', '>', '?', '!', '-', ':', '"', '[', ']',
    '{', '}', '(', ')', '_', '+', '=', '|', '\\', '%', '@']).
% right1stmod(List,Firstpart,Modpart): Modpart begins with the first
% word in List which is a modifier; Firstpart are the preceding words
right1stmod([],[],[]) :- !.
% X is a modifier or finding; Beginning part is empty
right1stmod([X|Rest],[],[X|Rest]) :-
    foundword(X,Sem,Target),
    (modifier(Sem); Sem = p, Target = [_ ,conn]; subtype(_, [Sem])), !.
% X is not a modifier or finding
right1stmod([X|Rest],[X|Firstpart],Modpart) :-
    right1stmod(Rest,Firstpart,Modpart).

% frame(Frame,Type,Value,Mods): creates a list Frame, whose 1st
% element is Type, 2nd element is Value, and 3rd is a list of
% modifier frames or is empty
% Case where modifier list is empty; Value should be atom except for
% certain types;
frame([Type,Value],Type,Value,X) :-
    (X = []; X = [[]]),
    atom(Value), !.
% Special cases where value of type should be a list
frame([Type,[H|R]],Type,[H|R],X) :-
    (X = []; X = [[]]),
    oklist(Type), !.
% Modifier list is merged with list consisting of Type and Value
frame(Frame,Type,Value,Mods) :-
    atom(Value),
    append([Type,Value],Mods,Frame), !.

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```

frame(Frame, Type, [H|R], Mods) :-
    is_list(R),
    append(R, Mods, NewMods),
    append([Type, H], NewMods, Frame), !.
% Components of Frame
frame([Type, Value|Mods], Type, Value, Mods) :- !.
% Value of Type should not be a list; first element of value is real value
frame([Type, H, Rest], Type, [H|Rest], []) :- !.
% Special cases where value of type should be a list
% frame([Type, [H|R]], Type, [H|R], []) :- %repeated from rule above
% oklist(Type), !.
% Value of Type should not be a list; first element of value is real value
frame(Frame, Type, [H|Rest], Mods) :-
    mergemods(Rest, Mods, NewMods),
    append([Type, H], NewMods, Frame).

% mergemodinf(-F, +Frame, +Mods): Frame is a type-value-mod frame; Mods
% is an additional set of modifiers for Frame; mergemodinf adds Mods
% to Frame, resulting in F.
mergemodinf([], [], _) :- !.
mergemodinf(F, [rel, X|Rest], Modrel) :-
    mergemodinf(F1, Rest, Modrel),
    append([rel, X], F1, F), !.
mergemodinf(F, [F1, X|Modfin], Modrel) :-
    atom(F1), mergemods(Modrel, Modfin, Mod),
    append([F1, X], Mod, F), !.
mergemodinf(F, [H|R], Modrel) :-
    mergemodinf(F1, H, Modrel),
    mergemodinf(F2, R, Modrel),
    append([F1], F2, F).
% addmodstof(+Args, +Mods, -NewArgs) is true if Args is a list of formats,
% Mods is a list of modifiers and NewArgs is a list of formats where Mods
% has been added to modifier list of that format
addmodstof([], _, []) :- !. % no more formats
addmodstof([Format1|Rest], Mods, [F1|NewRest]) :-
    mergemodinf(F1, Format1, Mods), % merge modifiers into 1st format
    addmodstof(Rest, Mods, NewRest), !. %add modifier to remaining
% oklist(+Type): is true if Type can have a list as its value
oklist(unitval).
oklist(age).
oklist(measure).
oklist(prev_timeunit).
oklist(future_exam).

% mergemods(+Mods1, +Mods2, -Mod): Mods1 and Mods2 are a list of modifier lists
% Mod is the merged list; some elements of Mods1 and Mods2 may be
% empty
mergemods([], M, M) :- !.
mergemods(M, [], M).
mergemods(Mods1, Mods2, Mod) :-
    delete(Mods1, [], M1),
    delete(Mods2, [], M2),
    append(M1, M2, Mod).

% addmod(+Mod, +Modlist, -NewMod): NewMod is formed by including
% Mod into Modlist
addmod([], Mod, Mod) :- !.

```

```

addmod(Mod, [], [Mod]) :- !.
addmod(Mod, Modlist, NewMod) :-
    append([Mod], Modlist, NewMod).
% modlist(+ListofMods, -Mods): ListofMods is a list consisting of
%   individual modifier frames, some of which may be empty
%   Mods is formed as a list of non-empty modifiers
modlist([], []) :- !.
% ignore a modifier which is an empty list
modlist([[] | R], Mods) :-
    modlist(R, Mods), !.
modlist([[H|R1] | R2], Mods) :-
    atom(H), !,
    modlist(R2, Rmods),
    addmod([H|R1], Rmods, Mods).
modlist([[H|R1] | R2], Mods) :-
    is_list(H), !, % is first element is a list
    modlist(R2, Rmods),
    mergemods([H|R1], Rmods, Mods).

%bpframe: creates from for sequences of bodyloc/region/position
bpframe(F, [], _, F, []) :- !. % only 1 bodyloc
bpframe(F, [], Type, Bp1, Bp2) :- % no conj relation but more than 1 bodyloc
    frame(Bp1, Bp1Type, Bp1Val, Bp1Mods), %contents of Bp1 frame
    frame(Bp2, Bp2Type, Bp2Val, Bp2Mods), %contents of Bp2 frame
    ( (Bp1Type = region; Bp1Type = position),
      Bp2Type = bodyloc, % 'left lung', 'area of lung'
      mergemods(Bp1Mods, Bp2Mods, BpMods), %new region modifier
      frame(NewBp2Mods, Bp1Type, Bp1Val, BpMods), %new Bp1 frame w new mod
      frame(F, Bp2Type, Bp2Val, [NewBp2Mods]) % main frame is bodyloc
    ;
      Bp1Type = bodyloc, Bp2Type = bodyloc, Type = main, %Bp2 is main
      mergemods(Bp1Mods, Bp2Mods, BpMods), %new bodyloc modifier
      frame(NewBp2Mods, Bp1Type, Bp1Val, BpMods), % 'joint of shoulder'
      frame(F, Bp2Type, Bp2Val, [NewBp2Mods]) % main bp frame is shoulder
    ), !.
bpframe(F, Rel, _, Bp1, Bp2) :- % no conj relation but more than 1 bodyloc
    Rel = [rel, Conj | _], Bp2 \= [],
    mergemods([Bp1], [Bp2], Conjargs),
    frame(F, rel, Conj, Conjargs).

getrelation(R, F1, F2, F) :-
    (F2 \= [],
     (F1 = [rel, Conj1 | Rest1], R = [rel, Conj],
      (Conj1 = ','; Conj1 = or; Conj1 = and),
      (Conj = ','; Conj = or; Conj = and);
      Rest1 = [F1]),
     (F2 = [rel, Conj2 | Rest2],
      (Conj2 = ','; Conj2 = or; Conj2 = and);
      Rest2 = [F2]),
     %splice([R, Rest1, Rest2], F);
     append([R, Rest1, Rest2], F);
     F2 = [], F = F1 ).

```

```
uptotal :-  
  addstotal(X),  
  X =< 50,  
  NewX is X + 1,  
  retractall(addstotal(X)),  
  assert(addstotal(NewX)), !.
```

Appendix E

```

$save{ 'a' } = 'AAAC';
$save{ 'b' } = 'AAAG';
$save{ 'c' } = 'AAAT';
$save{ 'd' } = 'AACC';
$save{ 'e' } = 'AACG';
$save{ 'f' } = 'AACT';
$save{ 'g' } = 'AAGC';
$save{ 'h' } = 'AAGG';
$save{ 'i' } = 'AAGT';
$save{ 'j' } = 'AATC';
$save{ 'k' } = 'AATG';
$save{ 'l' } = 'AATT';
$save{ 'm' } = 'ACAC';
$save{ 'n' } = 'ACAG';
$save{ 'o' } = 'ACAT';
$save{ 'p' } = 'ACCC';
$save{ 'q' } = 'ACCG';
$save{ 'r' } = 'ACCT';
$save{ 's' } = 'ACGC';
$save{ 't' } = 'ACGG';
$save{ 'u' } = 'ACGT';
$save{ 'v' } = 'ACTC';
$save{ 'w' } = 'ACTG';
$save{ 'x' } = 'ACTT';
$save{ 'y' } = 'AGAG';
$save{ 'z' } = 'AGAT';
$save{ '0' } = 'AGCC';
$save{ '1' } = 'AGCG';
$save{ '2' } = 'AGCT';
$save{ '3' } = 'AGGC';
$save{ '4' } = 'AGGG';
$save{ '5' } = 'AGGT';
$save{ '6' } = 'AGTC';
$save{ '7' } = 'AGTG';
$save{ '8' } = 'AGTT';
$save{ '9' } = 'ATAT';
$save{ ' ' } = 'ATCC';
$save{ ']' } = 'ATCC';
$save{ '[' } = 'ATCC';
$save{ ';' } = 'ATCC';
$save{ ':' } = 'ATCC';
$save{ '"' } = 'ATCC';
$save{ '\' } = 'ATTC';
$save{ '?' } = 'ATCC';
$save{ '!' } = 'ATCC';
$save{ '#' } = 'CCCG';
$save{ '$' } = 'CCCT';
$save{ '^' } = 'CCGG';
$save{ '&' } = 'CCGT';
$save{ '*' } = 'CCTG';
$save{ '(' } = 'ATCC';
$save{ ')' } = 'ATCC';

```

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```
$save{ '_' }='CGCT';  
$save{ '-' }='ATCC';  
$save{ '+' }='CGGT';  
$save{ '=' }='CGTG';  
$save{ '}' }='CGTT';  
$save{ '{' }='CTCT';  
$save{ ',' }='ATCC';  
$save{ '.' }='ATCC';  
$save{ '|' }='CTTG';  
$save{ '%' }='CTTT';  
$save{ '/' }='ATCC';  
$save{ '\\ ' }='GGTT';  
$save{ '@' }='GTGT';  
$save{ "\\n" }='ATCC';  
$save{ '<' }='GTTT';  
$save{ '>' }='GTTT';  
$save{ '~' }='GTTT';
```

Appendix F

```

#!/usr/bin/perl
#Scan.pl : Scans blast output
#Author: Michael Krauthammer
#Copyright: c.1999, Columbia University

#Variables

#blast input/file
$input_file="genbank.result";
#program output
$output_file="match.txt";

#open datastream for file which contains blast output
open (INPUT, '/storage/psi-blast/MarkIt/programs/markIt.result');

while ($line=<INPUT>){
    if ($line=~/\>gi\|(\d*) (.*)\, (.*)\, (.*)/){
        $target=$4;
        $gi=$1;
        $semantic_class=$3;
    }
    if($line=~ /Length = (.*)/){
        $lengthI=$1;
    }
    if ($line=~ /Identities \= (\d*)\//){
        $length_actual=$1
    }
    if ($line=~ /Query: (\d*)/){
        $start=$1;
    }
}
#print if Subj 1, sometimes match 2 or 3 line long

    if ($line=~ /Sbjct: 1 /){
        if (($length_actual/$lengthI) > .9){
            print
            $target, "|", $start, "|", $start+$lengthI, "|", $semantic_class, "|", $gi, "\n";
        }
    }
}

```


Appendix **G**

```
#!/usr/bin/perl
#nucleotide_text_parser.pl
#Author: Michael Krauthammer, c.1999 Columbia University

open (INPUT,$ARGV[0]);

#read uncoded input text line by line (chop it)
$all='';
while ($line=<INPUT>){
    $all=$all.$line;
}
open (INPUTII,'/storage/psi-blast/MarkIt/programs/markItII.result');
open (OUTPUT,'>result.txt');
#first part: check matches, store positions

while ($line=<INPUTII>){

    ($name,$start,$end,$semantic_class,$gi)=$line=~/(.*)\\|(.*)\\|(.*)\\|(.*)\\|(.*)/;

    #divide by 4 (4 letter code)
    $start=($start-1)/4;
    $end=($end-1)/4;

    #get substring
    if ($start != 0){
        $letters=substr($all,$start-1,$end-$start+3)."|";
    } else {
        $letters = ' '.substr($all,0,$end+2)."|";
    }
    ($letter_beginning)=$letters=~/(^.)//;
    $letter_end=substr($all,$end,1);
    $letter_endII=substr($all,$end,2);
    #ignore matches that are in the MIDDLE of sentences, allow plurals
    $letter_beginning=~tr/[A-Z]/[a-z]/;
    $letter_end=~tr/[A-Z]/[a-z]/;
    if (((!($letter_beginning=~/[a-z]/)) && (!($letter_end=~/[a-z]/)) ||
        ($letter_endII=~s /))) {

        #make sure only the first occurrence is stored at this position
        if ($save{$start}==''){
            $save{$start}=$end.'|'.$semantic_class.'|'.$gi;
        }
        foreach $key(keys(%save)){
            ($end_key)=$save{$key}=~/^(.*)\\|//;
            if ($end_key>$end){
                if ($key<$start){
                    $save{$start}='null',
                }
            }
        }
    }
}
}
```

```
#second part: print out marked up document
sort(%save);
for ($i=0;$i<length($all);$i++){
    if (($save{$i}=='null') && ($save{$i}!=~/./)){
        ($send,$semantic_class)=$save{$i}~/(.*)\|(.*)\|/;
        print OUTPUT '<phr="' , $semantic_class, '">';
        $store=substr($all,$i,$send-$i);
        print OUTPUT $store;
        print OUTPUT "</phr>";
        $i=$send-1;
    } else {
        $store=substr($all,$i,1);
        print OUTPUT $store;
    }
}
```

HMMER2.0
 NAME ARMpt.txt
 DESC
 LENG 55
 ALPH Amino
 RF no
 CS no
 COM [converted from an old Plan9 HMM]
 NSEQ 0
 DATE Mon Mar 8 11:39:08 1999
 XT -8455 -4 -1000 -1000 -8455 -4 -8455 -4
 NULT -4 -8455
 NULE 595 -1558 85 338 -294 453 -1158 197 -4
 HMM A C D E F G H I K L M N P Q R S T V W Y
 m->m m->i m->d i->m i->i d->m d->d b->m m->e
 -2188 * -357
 1 -1319 -546 894 -1877 -1561 -1153 -940 1578 -1087 -1655 -2202 832 -1485 1805 -1860 -1579 -1499 1882 -1780 -1622
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 3 -9395 -10395 -732 -1329 -2823 -220 2188 *
 2 409 -681 -1208 -1083 305 -1288 -1075 1842 -1222 691 -2336 -580 -1619 2198 -1995 -1714 -1633 -38 -1915 -1757
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 3 -9582 -10582 -732 -1329 -4299 -75 *
 3 446 -681 1026 -344 -1696 -1288 -1075 1009 -1222 -1790 -2336 1945 -1619 -1733 -1995 -1269 -700 1696 -1915 -1757
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 3 -9582 -10582 -732 -1329 -3809 -107 *
 4 765 2349 182 -2039 -1723 -1315 -1102 1207 -1249 255 -2364 -1851 -1646 -1760 486 -1741 -267 1553 -1942 -1784
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 3 -9620 -10620 -732 -1329 -4269 -77 *
 5 197 -708 698 -2039 -1723 888 -1102 1691 -1249 -390 -2364 1835 -1646 262 -2022 -270 -1660 -808 -1942 -1784
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 3 -9620 -10620 -732 -1329 -2431 -296 *
 6 171 2253 498 -1592 -1870 195 -1249 1263 -1103 -1964 474 550 -69 -34 -2169 -39 -1808 1232 -2089 -1931
 - 206 981 -178 -351 -36 372 584 -636 437 -129 -677 -164 40 -71 -336 -53 26 -12 -256 -97
 - 4216 -81 -10816 -30 -5612 -3946 -97 *
 7 1399 -920 95 -2251 -1935 972 -1314 1039 -1461 -2029 -2575 -788 816 166 157 -1271 -1872 989 -2154 -1995
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 2 -9899 -10899 -732 -1329 -2057 -396 *
 8 26 1286 -2209 -2382 -330 324 -1445 982 -1592 370 -2707 -2194 844 -2103 665 -620 -2003 1711 -2285 -2127
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 2 -10066 -11066 -732 -1329 -2046 -400 *
 9 -1917 642 -2302 -732 -240 -1751 -1538 896 61 1533 -2800 -2287 886 1377 -350 -2177 -2096 825 -2378 -2220
 - 206 979 -178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
 - 2 -10183 -11183 -732 -1329 -2258 -338 *

NY02:195625.1

10	-626	1137	505	-783	317	-1800	-1587	606	-840	77	-2849	8	1358	802	779	-985	-2145	788	-2427	-2269
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10243	-11243	-732	-1329	-1983	-421	*	*											
11	-504	1916	85	211	-290	-1851	1259	-110	-1052	719	516	-2388	-235	-243	95	-197	-2197	1042	-2478	-2320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10305	-11305	-732	-1329	-2912	-206	*	*											
12	-2017	-1244	-229	-447	695	-2	-1638	1452	-300	1493	-2900	-2388	-2183	-2296	-2558	-386	-2197	1266	-2478	-2320
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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13	-1487	-1381	-1377	1340	1111	-1989	574	1294	-617	1387	-1622	-2525	-782	-400	-2696	-2415	-2334	731	-2615	-2457
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-10480	-11480	-732	-1329	-417	-1994	*	*											
14	-332	-1506	667	-492	-525	-843	854	-107	-477	812	543	-165	-706	1408	-2145	189	-2459	743	-786	-2582
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10629	-11629	-732	-1329	-1232	-800	*	*											
15	-86	-948	-1755	-449	-642	765	1262	485	-569	1116	-3162	-2273	58	-72	-1071	729	-525	-899	-2740	-958
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10629	-11629	-732	-1329	-656	-1453	*	*											
16	-25	-1526	-2683	135	-292	264	677	-262	143	640	1292	-84	-487	167	-2840	-978	-859	1368	-2760	-2602
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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17	-536	793	-209	-465	-47	-1813	410	1703	145	494	-479	120	-2495	511	-904	-60	-128	8	-2791	-2633
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18	-382	-1495	1353	-1441	-657	389	1248	-642	-500	-495	-244	1034	1035	-406	-174	463	-2447	-1430	-2729	228
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-	-51	-10615	-4886	-732	-1329	-28	-5677	*	*											
19	913	2484	-219	359	-2532	-1164	1125	-3132	479	-928	-3173	975	790	-2317	837	-804	-2300	-458	-2751	-9
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-	-51	-10642	-4871	-732	-1329	-37	-5317	*	*											
20	-2289	110	229	-1825	140	767	1482	-3130	-614	95	21	443	-2455	-94	269	250	240	1059	-2750	-43
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-44	-10640	-5097	-732	-1329	-36	-5357	*	*											
21	-1533	666	-2680	-928	722	-1728	-1916	528	-281	875	358	-274	1371	-539	-288	-1571	-2474	1458	-2756	-200
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-	-27	-10647	-5824	-732	-1329	-39	-5231	*	*											
22	-766	-285	-2694	590	-948	-1182	-1930	834	584	163	506	-63	-518	-530	-372	618	655	262	-2770	-365
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23	-1378	-1469	-1334	-2089	1114	-2076	1292	-832	1032	476	-3125	-2612	1427	876	389	328	-139	-339	-2703	-2545
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-	-28	-10585	-5756	-732	-1329	-23	-6013	*	*											
24	-1282	774	-1377	443	101	76	-1223	-151	-806	514	-1530	-658	805	-377	493	-249	3	1071	-2770	-2612
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-97	-10664	-3960	-732	-1329	-48	-4928	*	*	590	1399	-3133	-856	-2416	1773	-473	-1253	-1435	-2005	-2711	-2553
25	1067	-1202	-37	-502	196	-2084	-1871	-301	590	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-60	-10594	-4642	-732	-1329	-24	-5923	*	*	225	694	-1542	435	358	690	-627	224	-2463	-39	-2744	-2586
26	-444	937	-1062	179	1131	-1717	441	6	225	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-1	-10633	-11633	-732	-1329	-33	-5450	*	*	578	-60	-3213	-268	412	271	105	99	-2087	-2548	2818	-2633
27	1410	-1557	-891	1052	-323	-589	-606	-3171	-578	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
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-	-1	-10688	-11688	-732	-1329	-76	-4293	*	*	461	451	-3213	-2700	-2495	-96	-2871	261	583	9	1503	-1076
28	1615	923	-891	228	-1126	-884	555	-1357	-461	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10688	-4878	-732	-1329	-76	-4293	*	*	607	1219	-622	-2658	-562	-2567	281	-462	-2467	-113	2781	767
29	913	466	-157	-2846	-103	-2122	-1909	607	-1272	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-39	-10639	-5257	-732	-1329	-36	-5358	*	*	134	-769	-1299	-291	895	718	-510	763	914	-2517	2685	-2602
30	964	-1526	-2080	-298	-772	-245	-1920	-3140	134	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-37	-10652	-5357	-732	-1329	-42	-5132	*	*	835	-704	-3183	1766	-935	-541	-324	264	589	370	1969	-2440
31	-26	-1528	-458	-771	-166	-1713	716	-1310	835	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-51	-10654	-4884	-732	-1329	-42	-5131	*	*	450	377	-3172	439	-1060	-1176	-2830	-104	502	-840	-2750	167
32	340	-1516	41	355	-2531	-188	628	1489	-450	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-73	-10640	-4352	-732	-1329	-35	-5363	*	*	57	-119	-3153	1526	-295	346	-869	91	485	-581	-2732	-1391
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-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-84	-10619	-4156	-732	-1329	-29	-5639	*	*	326	-1323	-3146	1757	-1344	955	-145	433	352	-623	-2724	-1350
34	867	-1046	-2203	-2608	481	-2097	-415	847	326	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-26	-10609	-5858	-732	-1329	-27	-5771	*	*	219	-295	-3193	534	378	-2589	-1529	-16	-30	200	2540	-2613
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-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-10665	-7013	-732	-1329	-50	-4882	*	*	75	-2134	-2379	130	-2166	-141	396	390	962	-180	-2782	-2623
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-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-10677	-6625	-732	-1329	-65	-4498	*	*	2086	121	-318	-2688	-2483	-2597	-279	687	405	-1121	-2779	-2621
37	1439	628	-444	-407	-147	829	-1939	638	-2086	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-91	-10674	-4054	-732	-1329	-62	-4563	*	*	519	-1267	-3137	-111	-2420	1538	-672	992	353	-308	2122	-2557
38	711	-1482	-650	-502	-2497	884	-1876	-553	-519	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	206	979	-178	-352	-36	372	585	-635	438	*	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-86	-10600	-4127	-732	-1329	-1206	-820	*	*	508	-2473	-3080	1423	-845	1191	388	-2457	569	-2415	2553	-2307
39	842	-1424	306	59	-270	-23	-1818	-1813	508	508	-2473	-3080	1423	-845	1191	388	-2457	569	-2415	2553	-2307

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-193	-10531	-3005	-732	-1329	-1208	-818	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-74	-10391	-4344	-732	-1329	-2887	-209	*	*											
41	1527	349	70	-1213	-2263	-499	-1642	708	-1789	-894	-2903	-2391	-2186	1456	-2562	379	378	-452	2815	-2323
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-193	-10318	-3008	-732	-1329	-3118	-177	*	*											
42	1659	1040	-171	-2423	-2107	-1699	-1486	-2707	-1633	-954	-2748	1305	-282	1679	-2406	1051	-43	-592	-2326	-2168
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-211	-10125	-2887	-732	-1329	-3580	-126	*	*											
43	-502	-928	-2086	-2259	-1943	956	-1322	913	-1469	475	-2584	1310	-1867	1031	-286	-1961	-1881	-1919	3900	-2004
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-80	-9916	-4248	-732	-1329	-3955	-96	*	*											
44	1388	-868	-2026	-2199	-705	378	-1262	1099	-1409	-1133	-2524	379	-1807	-694	175	-1901	1643	381	-2102	-1944
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9837	-10837	-732	-1329	-4047	-90	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-2	-9837	-10837	-732	-1329	-4047	-90	*	*											
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-	-85	-9522	-4167	-732	-1329	-4329	-74	*	*											
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-	-401	-9082	-2055	-732	-1329	-4571	-62	*	*											
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55	-616	158	-1000	-70	-857	-449	-236	-1457	-384	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-	*	*	*	*	*	*	*	*	0											

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HMME2.0																				
NAME ASP-GLU																				
DESC																				
LENG 87																				
ALPH Amino																				
RF no																				
CS no																				
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DATE Mon Mar 8 11:41:44 1999																				
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NULT -4 -8455																				
NULE 595 -1558																				
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	m->m	m->i	m->d	i->m	i->i	d->m	d->d	b->m	m->e											
	-3647	*	-120																	
1	-447	326	-832	519	-689	-281	-68	-1289	624	1235	-196	-818	-613	1006	-988	64	-627	-666	-908	-750
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-	-10	-7736	-8736	-732	-1329	-3599	-124	-3647	*											
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-	-379	-7914	-2139	-732	-1329	-1797	-490	*	*											
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-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7535	-8535	-732	-1329	-3230	-163	*	*											
9	-482	291	-866	1262	200	-316	-103	-1323	591	581	-1364	-852	675	-423	-1023	463	-661	-700	-943	-784
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16	-751	1900	-1136	-1309	-993	-115	-372	-1593	-280	-226	916	-763	568	-654	-1292	1139	1426	62	-1212	-1054
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17	-757	17	198	-114	-635	-590	-377	185	-525	893	1300	-1127	-154	-554	-1297	-443	-936	1419	-1217	-1059
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-	-8	-8158	-9158	-732	-1329	-2693	-242	*	*	*	*	*	*	*	*	*	*	*	*	*
18	-757	17	993	1177	-998	-590	-377	-1598	-525	-253	-1639	-1127	-154	-1035	-1297	759	1527	-975	537	-1059
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19	-757	1387	617	-572	-639	-590	-377	-1598	-136	1458	-1639	-1127	1353	711	-1297	-1017	-604	-975	-1217	-1059
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24	-316	-10	609	2176	-1025	-617	-404	-684	-365	-742	-1666	-1154	239	-1062	139	-480	-277	-1002	1146	-1086
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35	-622	151	-503	1105	-864	406	-243	-391	-849	-243	476	-101	-993	1054	-901	-1163	-236	42	-242	1500	-925
-	206	979	-178	-352	-36	372	585	438	-635	585	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-96	-7877	-4057	-732	-1329	-2386	-306	*	-635	-306	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
36	198	188	-690	579	-827	657	-206	-353	-1426	-206	-91	-562	1354	646	-525	-1126	259	-764	-203	-1046	-887
-	206	979	-178	-352	-36	372	585	438	-635	585	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7792	-8792	-732	-1329	-2350	-315	*	-635	-315	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
37	-455	160	893	-1172	-856	-448	-235	-382	-1455	-235	-368	-1496	1552	1488	-55	-1155	253	-793	25	982	-916
-	206	979	-178	-352	-36	372	585	438	-635	585	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7870	-8870	-732	-1329	-2659	-249	*	-635	-249	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
38	-614	160	-998	643	-856	-448	-235	-382	-1455	-235	848	-740	217	-779	226	-1155	577	-793	685	878	-916
-	206	979	-178	-352	-36	372	585	438	-635	585	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7870	-8870	-732	-1329	-2659	-249	*	-635	-249	*	-677	-164	41	-73	-335	-54	27	-12	-255	-97
39	347	160	754	399	228	-448	-235	-382	-1455	-235	1042	-1496	217	727	-893	-1155	-364	-793	-832	-1074	-916

-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-76	-7870	-4418	-732	-1329	-2659	-249	*	*	*	*	*	*	*	*	*	*	*	*	*
40	470	189	166	-1142	-826	-418	-205	-1425	-352	537	-720	-954	240	-863	-1125	1548	-13	-183	-1045	-887
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-163	-7783	-3291	-732	-1329	-2182	-359	*	*	*	*	*	*	*	*	*	*	*	*	*
41	-42	246	-354	-424	-769	-361	-148	-924	-295	466	169	-897	743	783	421	656	158	-745	-988	-830
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-58	-7603	-4877	-732	-1329	-2440	-294	*	*	*	*	*	*	*	*	*	*	*	*	*
42	416	243	-18	499	-772	98	-151	-937	-298	625	-653	-109	-129	-809	313	-595	-480	547	-991	-833
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-7657	-8657	-732	-1329	-2248	-341	*	*	*	*	*	*	*	*	*	*	*	*	*
43	-605	169	93	334	-846	21	-225	-1446	-373	446	1232	-975	923	241	-1145	692	-784	174	-1065	-907
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-9	-7863	-8863	-732	-1329	-1877	-458	*	*	*	*	*	*	*	*	*	*	*	*	*
44	-622	521	1100	-1180	-864	880	-243	-1464	-391	-26	-770	-680	799	-488	-1163	757	784	-841	-1083	-925
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-175	-7877	-3184	-732	-1329	-1750	-509	*	*	*	*	*	*	*	*	*	*	*	*	*
45	1115	217	736	114	-388	-390	903	-1398	-324	-742	-1439	-626	1239	318	-1097	-634	-736	-44	100	-466
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-11	-7679	-8679	-732	-1329	-1918	-443	*	*	*	*	*	*	*	*	*	*	*	*	*
46	503	1267	571	66	-451	-436	-223	-1443	-370	319	-1484	-972	1436	-881	-1143	3	503	-820	-1063	-905
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-10	-7804	-8804	-732	-1329	-2221	-348	*	*	*	*	*	*	*	*	*	*	*	*	*
47	276	171	-50	290	-844	-436	-223	-616	-370	-648	2313	-972	537	-881	52	-174	-503	762	-1063	-905
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-89	-7804	-4177	-732	-1329	-1785	-495	*	*	*	*	*	*	*	*	*	*	*	*	*
48	179	176	1312	293	-839	358	-218	-1100	-365	195	703	-405	860	-552	-1138	-857	-777	41	-1058	-900
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-74	-7794	-4454	-732	-1329	-1710	-526	*	*	*	*	*	*	*	*	*	*	*	*	*
49	-603	170	1251	431	-845	41	-224	-1444	-371	-199	-1486	618	1188	-561	-1144	204	-783	266	-1064	-906
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-57	-7807	-4870	-732	-1329	-1790	-492	*	*	*	*	*	*	*	*	*	*	*	*	*
50	67	163	-295	-1169	-852	-444	-231	-1119	-379	981	-1493	-570	1006	196	-384	-870	371	496	1512	-913
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-42	-7825	-5384	-732	-1329	-2212	-351	*	*	*	*	*	*	*	*	*	*	*	*	*
51	200	175	448	-230	159	-237	-219	-1439	-366	478	1195	-968	730	-877	-1139	-495	519	309	-89	-900
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-110	-7816	-3852	-732	-1329	-1828	-477	*	*	*	*	*	*	*	*	*	*	*	*	*
52	658	208	433	338	-497	-400	-187	-1407	-334	876	-1448	-936	902	-527	-1107	104	-98	-784	-1027	-868
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-88	-7703	-4207	-732	-1329	-2026	-406	*	*	*	*	*	*	*	*	*	*	*	*	*
53	917	218	-584	368	-196	-179	-176	294	-324	-892	-1438	-132	795	-834	-1096	730	73	-774	-31	-432
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-60	-7743	-4798	-732	-1329	-1419	-676	*	*	*	*	*	*	*	*	*	*	*	*	*

54	582	160	86	455	-531	-96	-235	-1455	-382	-457	-1496	-984	2014	-893	-1155	-355	-142	-832	1282	-176
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-21	-7870	-6665	-732	-1329	-1630	-563	*	*	*	*	*	*	*	*	*	*	*	*	*
55	751	147	398	821	-868	-460	-247	-1468	-395	-377	-1509	-997	301	1472	-1167	-887	1054	-845	-1087	-929
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-107	-7879	-3889	-732	-1329	-1847	-470	*	*	*	*	*	*	*	*	*	*	*	*	*
56	398	184	1349	-390	-831	248	-210	-1430	-357	-925	-1471	-166	1286	-868	-1130	-657	302	-188	2042	-891
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-153	-7788	-3377	-732	-1329	-2323	-322	*	*	*	*	*	*	*	*	*	*	*	*	*
57	-532	241	-651	-283	766	-218	205	-548	-301	-579	-1415	-903	1761	-811	-456	-792	-36	1252	-993	-835
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-162	-7632	-3303	-732	-1329	-2307	-326	*	*	*	*	*	*	*	*	*	*	*	*	*
58	1034	278	753	710	-737	384	-116	-1337	-264	-832	-87	-866	-209	-774	-1036	-575	693	64	-956	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7533	-8533	-732	-1329	-2717	-238	*	*	*	*	*	*	*	*	*	*	*	*	*
59	579	278	-617	1313	-737	174	-116	-1337	-264	-478	-1378	514	724	369	-1036	-188	-115	-714	-956	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-12	-7533	-8533	-732	-1329	-2717	-238	*	*	*	*	*	*	*	*	*	*	*	*	*
60	1098	278	487	-534	211	-133	-116	-1337	-264	-683	-1378	-866	964	-79	-1036	-755	-675	-714	3120	-798
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-144	-7533	-3481	-732	-1329	-2717	-238	*	*	*	*	*	*	*	*	*	*	*	*	*
61	725	333	-570	-998	925	-274	-61	-1281	-208	473	-1323	-810	1742	-413	-981	-700	-412	-213	-901	-743
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-170	-7371	-3247	-732	-1329	-2845	-216	*	*	*	*	*	*	*	*	*	*	*	*	*
62	406	398	148	-26	-617	776	4	-1216	-143	-711	-1258	-402	1159	-654	367	-635	676	-593	-836	-678
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-14	-7329	-8329	-732	-1329	-3371	-147	*	*	*	*	*	*	*	*	*	*	*	*	*
63	647	392	304	748	-623	-215	-2	-1222	-149	-547	1052	-751	1014	-660	-584	-641	110	48	-842	-684
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-13	-7333	-8333	-732	-1329	-2319	-323	*	*	*	*	*	*	*	*	*	*	*	*	*
64	680	355	1718	-635	-660	-252	-39	-1259	-186	-754	-567	-788	1015	-697	-576	-176	327	-636	-879	-721
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-	-117	-7358	-3795	-732	-1329	-2132	-374	*	*	*	*	*	*	*	*	*	*	*	*	*
65	350	370	-442	1145	-645	33	-24	-1244	123	-739	-1285	-773	1698	-682	-654	-28	-582	-378	-864	-706
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-168	-7258	-3274	-732	-1329	-3043	-187	*	*	*	*	*	*	*	*	*	*	*	*	*
66	1458	1314	-735	-651	-592	1428	29	-1192	-119	-534	-513	-721	-184	-629	-891	-610	-530	-569	-811	-653
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7109	-8109	-732	-1329	-3092	-180	*	*	*	*	*	*	*	*	*	*	*	*	*
67	-205	418	-740	-662	-597	-189	24	-1196	-123	-691	348	-725	2493	-634	-896	-5	-133	-310	-816	-658
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97
-	-16	-7111	-8111	-732	-1329	-3029	-188	*	*	*	*	*	*	*	*	*	*	*	*	*
68	1061	413	831	-275	-602	-10	19	-1201	-128	-696	-1242	26	-283	-639	592	349	-539	-131	-821	-662
-	206	979	-178	-352	-36	372	585	-635	438	-130	-677	-164	41	-73	-335	-54	27	-12	-255	-97

-	-16	-7114	-8114	-732	-1329	-3270	-158	*	-1201	*	-128	-696	1350	-730	852	-639	-901	-439	161	-578	-821	-662
69	505	413	-263	1351	-602	-194	19	-1201	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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-	-16	-7114	-8114	-732	-1329	-3270	-158	*	-1201	*	-128	-696	1350	-730	852	-639	-901	-439	161	-578	-821	-662
70	1301	413	-72	-670	-602	-50	19	-1201	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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-	-130	-7114	-3660	-732	-1329	-3270	-158	*	-1201	*	-128	-696	1350	-730	852	-639	-901	-439	161	-578	-821	-662
71	750	452	-448	433	-564	-156	57	-1163	-90	238	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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-	-44	-6968	-5504	-732	-1329	-3340	-150	*	-1153	-80	-648	-1195	-682	1105	721	1063	-151	-492	-530	-773	-615	-615
72	990	461	-697	-870	-554	0	67	-1153	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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73	1181	460	-698	-871	-555	-147	66	-1155	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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74	418	460	-698	-871	-555	-147	66	-1155	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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75	1183	460	-698	-871	-555	-147	66	-1155	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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76	902	484	-674	-848	-531	-123	89	-1131	-626	-1172	-660	-1172	-660	757	757	-568	-830	-305	1254	690	-750	-592
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-	-259	-6836	-2685	-732	-1329	-3453	-138	*	-1057	17	-552	-1098	-586	1561	1561	-494	-756	-2	-395	-433	-676	-518
77	1335	558	-600	-773	-457	-49	164	-1057	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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-	-24	-6490	-7490	-732	-1329	-3517	-132	*	-1057	17	-552	-1098	-586	1561	1561	-494	-756	-2	-395	-433	-676	-518
78	1075	558	-600	-773	-457	-49	164	-1057	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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79	1069	563	-595	-768	-452	-44	516	-1052	-635	438	-130	-677	-164	41	852	-639	-901	-439	161	-578	-821	-662
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ALPH Amino			
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CS no			
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DATE Mon Mar 8 11:42:00 1999			
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-	206	979	-178 -352 -36 372 585 -635 438 -130 -677 -164 41 -73 -335 -54 27 -12 -255 -97
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/10302

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 31/00; G06F 15/00, 17/00

US CL : 702/27; 706/45, 47; 712/200

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 702/27; 706/45, 47; 712/200

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	YUAN et al. Towards detection of orthologues in sequence databases. Bioinformatics. 1998, Vol. 14, No. 3, pages 285-289, see entire document.	1-32
Y	BAILEY, JR. et al. Analysis of EST-driven gene annotation in human genomic sequence. Genome Research. 1998, Vol. 8, pages 362-376, see entire document.	1-32
Y	SONNHAMMER et al. Pfam: A comprehensive database of protein domain families based on seed alignments. Proteins: Structure Function and Genetics. 1997, Vol. 28, pages 405-420, see entire document.	1-32

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

05 June 2000 (05.06.2000)

Date of mailing of the international search report

07 JUL 2000

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/10302

Continuation of B. FIELDS SEARCHED Item 3: STN Commercial Database (Biosis, Medline, Embase, Embal, SciSearch, Biotechds, Caplus)
West 2.0 (USPT, EPAB, JPAB, DWPI, TDBD)
Search Terms: gene tree, species tree, Hidden Markov, HMM, overlap, BLAST